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The Nautilus.

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THE CARDINAL TEETH OF PISIDIUM.

BY V. STERKI.

It has been asserted by earlier writers that *Pisidium amnicum* Müll. and *virginicum* Gmel. have two cardinal teeth in the right valve, and mainly on the strength of that character, Clessin has established the group *Fluminina*. Some authors have ascribed that feature to other species of *Pisidium*, or even to all, indiscriminately and without examination. But the whole thing is based on a misapprehension; the fact is that the two *Pisidia* named have only one cardinal tooth in the right valve (and two in the left, like all others), and consequently the feature holds good not only for *Pisidium*, but for the whole family, *Sphæriidæ*. It might be added that if those species had really two teeth, *Fluminina* would mean a distinct genus, at least.

In young, and even many half-grown specimens, there is plainly a single cardinal tooth, strongly curved. With advancing age there appears an indentation in the middle (above), as the anterior and posterior parts are growing more. They grow also in thickness, even the thinner anterior often becomes grooved, and at the same time the whole tooth becomes more curved, resp. angular, resembling the two in the left valve (inversely). But a careful examination will show that the two shanks are connected.

On the other hand, in many specimens of *P. compressum* Pr., *variabile* Pr., etc., there is a more or less marked indentation in the middle of the right cardinal.

NEW PISIDIA FROM ALABAMA.

BY V. STERKI.

Among the latest sending of *Sphæriidæ* from Alabama and Tennessee, collected by Mr. H. H. Smith and sent for examination by Mr. Bryant Walker, there were three *Pisidia* which could not be referred to any of the established species and not to each other. The mussels are all rather small, and none shows very salient features, but sufficient to be distinct. The type lots are in the collection of Mr. Walker, and specimens of the same in the Carnegie Museum, Pittsburgh, Pa. (The numbers cited are those of my special collection of *Sphæriidæ*).

P. albidum, n. sp.—Mussel rather well and regularly inflated, oblong-rounded on the posterior margin, subtruncate, supero-anterior slope slightly marked; beaks barely behind the middle, little elevated, rather small and somewhat mamillar, rounded or slightly flattened on top; surface dull, with fine to very fine, somewhat sharp, irregular, crowded striæ, smooth over the beaks; color whitish to pale corneous with narrow straw-colored zones along the margins; shell opaque to subtranslucent, thin; hinge rather slight, cardinal teeth well formed: the right curved to somewhat angular, slightly thicker at the posterior end, left anterior angular, posterior oblique, slightly curved; ligament rather slight and short.

Long. 3.8, alt. 3.2, diam. 2.2 mill.

Long. 2.8, alt. 2.4, diam. 2 mill.

Hab.: A spring, Sparta Branch (Murder Creek drainage), 5 miles south of Evergreen, Ala. (Conecuh Co.). [No. 6739].

Most specimens in the lot were juv. to half-grown, and only few apparently mature, yet of rather different sizes, as indicated. The oblong outlines, dull surface with rather sharp striæ, and the whitish color are sufficient to distinguish this Pisidium.

P. dispar, n. sp.—Mussel short-oval to subquadrate, medium inflated with the lower part somewhat flattened; beaks barely or not behind the middle, rather small, moderately prominent; superior margin somewhat curved, bounded by a rounded angle behind, barely any in front; surface dullish waxy, striæ very fine and slight, shallow, crowded, subregular; color pale-grayish horn, with narrow straw-colored marginal zones; hinge rather slight, cardinal teeth small, the right curved, with its posterior part thicker; a deep tri-

angular excavation below it; left anterior somewhat angular, pointed, the posterior oblique, slightly curved; lateral cusps short, pointed; ligament rather slight.

Long. 3.3, alt. 2.8, diam. 2 mill.

Hale.: Flood pools by Murder Creek, 3 miles south-west of Evergreen, Ala. [No. 6742].

Of the several dozen specimens, few if any, were full-grown, probably, all were somewhat rusty colored by a slight ferruginous deposit—combined with the size and shape, and color, the "waxy" dullish surface and the very fine slight striæ are sufficient to distinguish the species.

P. inornatum, n. sp.—Mussel small, high, well inflated; beaks little posterior, rather large, rounded somewhat prominent; superior margin rather short, moderately curved, bounded by angles, supero-anterior slope steep, slightly curved, anterior end rounded, posterior margin subtruncate at nearly right angles to the longitudinal axis, inferior margin well rounded; surface somewhat glossy, striæ fine and slight, subregular; color pale-corneous, shell translucent; hinge well formed, plate rather broad; cardinal teeth thin lamellar, all situated rather high up on the plate, the right curved, its posterior part deeply bifid; left anterior angular, posterior long, nearly longitudinal, curved; "side" cusps short, pointed, rugulose; ligament rather strong.

Long. 3, alt. 2.7, diam. 2.1 mill.

Hab.: Swampy land, Roanoke, Randolph Co., Ala. [No. 6747].

Although only about half a dozen specimens, they are sufficient to be recognized as representing a distinct species.

A VACATION TRIP TO CUBA.

BY WALTER F. WEBB.

If you have been working too hard on the farm, or feel all run down from the laborious duties of an active business or professional life, my advice to you is to take the first train for New York and get aboard one of the steamers heading towards the West Indies. It does not matter much where you get off; Cuba, Jamaica, Hayti or any of the islands farther south.

I went down by train and came back by boat, and the latter is the

most restful and the cheapest. I was determined to meet my old-time correspondent, Mr. C. T. Simpson, and look over the little earthly paradise he has created with his own hands, on a little plot of 15 acres bordering Biscayne Bay. He has one of the most interesting arboretums in the country and one cannot help but admire the artistic beauty of it all, reflecting, as it does, the genius and taste of the owner.

If you want to collect land shells in the West Indies, journey to the nearest hills, cliffs, railroad cuts, etc., and you will find them in all kinds of weather. There had been no rain in two months when I was in Cuba last December and I expected to find collecting poor. I I feel sure it was a poor time from a Cuban standpoint, but comparing it with the United States it was a veritable paradise. I landed at my hotel in Havana at 11 a. m. All settled in two hours, and started for one of the nearest likely points. A misty rain set in, which lasted until 3.30, and in two hours, with the aid of a helper, quietly picked up over one thousand perfect live specimens of as handsome Urocoptis, of several species, Chondropoma, Oleacina, Helicina, etc., as one would wish to see.

The next day we visited a different locality, exploring some hollows in stone walls, some good cactus patches near the old ocean, where every bit of board end rubbish we turned over revealed from 6 to 15 fine Cerion, and our catch was nearly two thousand. Mostly Chondropoma, Cerion, Cistula, etc.

We then started for the mountains in the southwest part of the island, Pinar del Rio province. For days we wandered among limestone cliffs several hundred feet high, explored wild caves evidently the hiding places of numerous bands of guerrilas during the eight-year war, and each day was a repetition of the other. Every section would contain new species different from the day before. We were very successful with the Urocoptis, part of which were always found on the sides of cliffs, usually within 15 feet of the ground, and about an equal number of species were always found under stones and other refuse. The Megalomastomas were about three inches deep in the ground, and associated with them were numerous Chondropomas and other operculates. The Oleacinas were always under the edges of stones. Limestone fences well isolated from hills were good collecting, as even some of the large Helix were hiding there, as well as Liguus. One hollow tree was well coated with good things, and they were hiding among the cactus as well.

A trip to the Province of Matanzas we found to be most interesting. The so-called mountains contained a large list of species and they were easy to collect. It reminded me of the old days years ago, when we used to go berry-picking. For hours one could walk along the face of the cliffs, and there was always enough in sight to keep up plenty of enthusiasm, until one was so completely tired out he was ready to quit. I had a young farmer with me from Indiana, a typical Hoosier, never outside of his county before, and he declared he never was so tired in his life. I will venture to predict that after tramping over a part of the three provinces of Cuba after snails, he will have more to tell his rural friends than the average tourist. His remarks about the country and people from day to day were a constant source of amusement, especially when he was unable to get a thing to eat, in the midst of plenty. A little smattering of Spanish is a good thing to take along with you when visiting a Spanish country. My little guide-book was sometimes more precious than gold, for we were in several towns where we could not find a person who spoke a word of English, and we were equally as ignorant of Spanish.

Not feeling at all sure that the editor of THE NAUTILUS will care for such a rambling article, I will refrain from further notes; but if any reader contemplates a trip to some of the classic collecting grounds of the West Indies, I will be pleased to give them such information as I can, which will help to make the trip a source of pleasure and successful as well.

THE CLASSIFICATION OF THE EUROPEAN NAIADES.

BY DR. A. E. ORTMANN.

Through the courtesy of Mr. W. Israël in Gera-Untermhaus, Germany, I have received a great number of European Naiades with soft parts, representing practically all species known to occur in central Europe. I do not presume to judge on the validity of the numerous species described by certain European writers, but rely in this respect on the opinion of the conchologists like Kobelt, Haas, Thiele, Israël, and others, chiefly since they are at present rather unanimous in assuming only a limited number of species, divided into a larger or smaller number of forms, races or varieties. The chief object of

the present communication is to point out the essential features of the anatomy, as far as they are of systematic value. This I deem an urgent necessity, since to all appearance the anatomy and the systematic relationship of the European forms is not very well understood among the European writers.

Family Margaritanidæ Ortmann.

The chief differences of this family are found in the incomplete gill-diaphragm; in the entire lack of a tendency to approach or to unite the mantle margins to form siphons; in the structure of the gills, which lack regular septa running parallel to the gill-filaments, and consequently, in the lack of the well-defined water-tubes (ovisacs in the female); in the marsupium being formed by all four gills; and in the small size and globular shape of the glochidium, without true hooks.

The only known genus is *Margaritana* Schumacher.

Margaritana margaritifera (Linnæus). I have the soft parts of a specimen from Thuringia (Elster River drainage).

The soft parts agree in all essential points with North American specimens of this species collected by myself in Schuylkill Co., Pa. I have considered the identity of the species as established.

Margaritana sinuata (Lamarck). This species is not before me. It is the *Margaritana crassa* of Simpson (P. U. S. Mus. 22, '00, p. 667). The mistake of Simpson in using the specific name *crassus* Retzius for this species has been amply demonstrated by Kobelt (Zur Kenntnis unserer Unionen, in: Festschr. 100-jaehr. Best. Wetterauisch. Ges. Naturk. Hanau. 1908, p. 99, and: Simpson und die europaeischen Najaden, in: Beitr. Kenntn. mitteleurop. Naj., Beil. Nachr. Bl. deutsch. malakozool. Ges. no. 3, 1909, p. 43). Recently, Haas (Nachr. Bl. etc., 4. 1910, p. 181) has created the new genus *Pseudunio* for this species, and gives a description of the soft parts. Unfortunately he fails to say anything about the gill-structure. But as far as this description goes, it is absolutely identical with that of the soft parts of *Margaritana margaritifera*, and the few differences of these two species pointed out by Haas I cannot regard but as specific differences. Haas apparently overestimates the differences, while he underestimates the resemblances, aside from neglecting entirely one of the most important characters (gill structure).

Much stress is laid upon the presence of lateral hinge teeth in

Margaritana sinuata. but I see no reason, why there should not exist species of *Margaritana* with hinge teeth, in fact, this is a logical postulate, if *Margaritana* in general is a primitive genus. Similar cases of genera containing species both with and without lateral teeth are met with, for instance, in *Alasmidonta* and *Symphynota.* Thus *Pseudunio* is to be regarded as a pure synonym of *Margaritana*, and has nothing whatever to do with *Unio.* Of course, the gill structure is yet unknown, but we have every reason to expect, that it will prove to be like that of *Margaritana margaritifera*, or will be very close to it.

Family UNIONIDÆ d'Orbigny (restr.)

This family has the following characters. The gill-diaphragm is complete; there is a tendency to approach the mantle margins at the point where the gill diaphragm reaches the mantle margins, and a tendency to unite these margins above the anal opening, so as to form an incomplete anal siphon, and leave, above it, a supraanal opening (This tendency is absent in a few North American types). The gills always have well-defined septa running parallel to the filaments, thus forming more or less regular water-tubes. In the female, in the marsupial gills, these water-tubes become ovisacs, and are much narrower than they are in the non-marsupial gills of either sex. The marsupium is formed either by all four gills, or only by the outer gills, or parts of the latter. The glochidium has various shapes, with or without hooks.

(*To be concluded.*)

BOSTON MALACOLOGICAL CLUB.

The Boston Malacological Club has just closed a most interesting season of meetings. With a membership of about thirty, the attendance has averaged twenty or more. It has been a matter of surprise to the members to see the diversity of subjects well handled by the different speakers. An idea can be had from the following as examples. Dr. Paul Bartsch on Collecting in the Philippines; Mr. F. N. Balch on Nudibranchs; Mr. C. W. Johnson on Distribution and variation of Busycon and Melongena; Mr. D. L. Belding on Economic forms in Mass.; Mr. Arthur Way on The Life of Say. Prof. Morse on Eyes in Lamellibranchs and other topics; Mr. Winkley on Mollusca and Changed Climate. We have also had exhibited interesting letters, photographs, drawings and specimens.

HENRY W. W[illegible]Y, Sec.

W. G. W. HARFORD.

We regret to record the death in Alameda, California, March 1st., of W. G. W. Harford, well known to all Pacific Coast naturalists. Mr. Harford was in the eighties and, up to a very recent date, in the possession of all his faculties. He had been the associate of the Trask, Veatch, Voy, Newcomb, Stearns, and other pioneer Pacific Coast naturalists, and for a long time kept "bachelor's hall" in a small shack on Telegraph Hill, with the late beloved botanist Dr. A. Kellogg; practically realizing the Scotch ideal of high thinking "on a little oatmeal." He was long a curator at the Academy of Sciences, San Francisco, and earned a precarious livelihood by collecting seeds, plants and other objects of Natural History, and by minor appointments at the University and other scientific institutions. He was especially interested in Conchology and was appointed naturalist to the U. S. Coast Survey expedition to Alaska in 1867 under the direction of Professor George Davidson; his report is printed in the Annual Report of the U. S. Coast Survey for 1867, Appendix 18.

He printed little and his life was devoted to helping others in their researches. Over six feet in height, of a Lincolnian gauntness, and a pioneer style of luxuriant beard and bushy eyebrows, his familiar figure will be missed by the old members of the California Academy, to whose meetings he was perennially faithful.

W. H. D.

PUBLICATIONS RECEIVED.

The Lymnæidæ of North and Middle America, Recent and Fossil. By Frank C. Baker (Chicago Academy of Sciences, Special publication No. 3, Feb. 15, 1911.) Pages xvi + 539, 58 plates). This handsome publication is the outcome of several years of study by Mr. Baker, in the course of which all of the large collections in this country containing type specimens have been examined. Chapters on the morphology, ecology, distribution, classification and nomenclature, and descriptions of fossil species, precede the systematic descriptions of the recent species, 65 in number, besides numerous subspecies.

85 species and varieties occur between latitude 38° and 60°; 13 occur north of 60°, 29 between 38° and 30°, and only 7 south of

30°. The 105th meridian roughly divides the eastern from the western Lymnæid fauna, only 17 species and varieties being common to both. The highest development of the group is in the glaciated portion of the continent.

The classification adopted presents several interesting features. Following Dybowski and some other European authors, Mr. Baker separates the *Planorbidæ* and *Ancylidæ* as families distinct from the *Lymnæidæ*, on the basis of differences in the shell and soft anatomy, which seem amply to justify that view.

The genus Lymnæa, as hitherto used in this country, is divided into the following genera and subgenera :

Genus *Lymnæa* Lamarck, type *L. stagnalis.*

" *Pseudosuccinea* Baker, type *L. columella.*

" *Radix* Montfort, type *L. auricularia* (Europe).

" *Bulimnea* Haldeman, type *L. megasoma.*

" *Acella* Haldeman, type *L. haldemani* (*L. gracilis* Jay).

" *Galba* Shrank, type *L. truncatula.*

Subgenus *Simpsonia* Baker, type *L. humilis.*

" *Stagnicola* Swainson, type *L. palustris.*

" *Leptolimnæa* Swainson, type *L. glabra* (European).

" *Polyrhytis* Meek, type *L. kingii* (fossil).

Genus *Pleurolimnæa* Meek, type *L. tenuicosta* (fossil).

The genus *Galba* contains nearly all of our species, *Lymnæa* and *Pseudosuccinea* each having two, *Bulimnæa* and *Acella* each one species. The genera are based upon quite readily recognized shell features, and rather small but apparently constant differences in the soft anatomy, chiefly the genitalia and teeth. The anatomical differences between the genera are not so great as are generally recognized as generic in the land snails, since they consist mainly of differences in the proportions of certain organs, rather than in the possession or absence of structures ; yet their value in classification depends upon their constancy in long series of species. Many more forms should be dissected with this in view. At present the evidence seems to favor recognition of the several genera in the Lymnæa group defined by Mr. Baker.

Numerous figures are given of the dentition, jaws and genitalia of American species,—one of the most valuable features of the work. In the terminology of the genitalia we would suggest a change, in order that it may conform to the usage in writings on land pulmo-

nates. The " penis sac " of Mr. Baker's descriptions is the *penis*, while the *non-invertible* tube surmounting it, which he designates " penis," seems strictly homologous with the *epiphallus* of land snails. Since these distinctions were introduced by the writer in 1892, they have been adopted universally by workers on land snail anatomy, and in the interests of uniformity it seems well to use the same terms in aquatic pulmonates.

In his attitude toward species Mr. Baker sides with the " splitters," quite as frankly as Binney, in Land and Fresh-water Shell II, inclined towards the " lumpers." It may turn out that the author has attached too much importance to local forms, and failed to make due allowance for variation of the same specific type under varying special conditions. Yet after all, the question is not one for a snap judgment; the status of each form must be decided separately, and often by local study, where the influence of local conditions on the associated species can be taken into account. It usually turns out that a work of this nature raises more questions than can be settled by a generation of conchologists. One of its valuable features is in stimulating investigation of the vast variety of forms shown to exist, of the correlation of shell-characters with ecologic factors, etcetera.

Many new species and subspecies, most of them originally described in this journal, are illustrated here for the first time by excellent photographic figures, which occupy 34 of the 58 plates, the others being devoted to anatomical and ecologic illustrations. The facts of distribution are graphically summarized by many maps printed in the text. H. A. P.

Descriptions of new mollusks of the family Vitrinellidæ from the west coast of America, by Paul Bartsch. (Proc. U. S. Nat. Mus., vol. 39, pp. 229–234. 1911.) *Cyclostroma baldridgei* (Gulf of Cal.); *C. miranda* (San Pedro); *C. adamsi* (Panama); *Circulus liriope* (Gulf of Cal.); *C. diomedeæ* (Panama); *Cyclostromella dalli* (Gulf of Cal.), are the new species described.

The recent and fossil mollusks of the genus Alabina from the west coast of America, by Paul Bartsch. (Proc. U. S. N. M., vol. 39, pp. 409–418. 1911.) Seven new species and two subspecies of this genus of minute Bittium-like shells are described from the recent and Tertiary faunas, and all of the known species are reviewed. Like the last paper, this is illustrated with excellent line engravings.

New species of shells collected by Mr. John Macoun at Berkley Sound, Vancouver Island, B. C. By William H. Dall and Paul Bartsch. (Canada, Dept. of Mines, Memoir no. 14-N. 1910.) In reporting upon this collection—the first to be made on the ocean side of Vancouver Island—attention is called to the interesting fact that the inland passages of this region, "perhaps affected by the discharge of cold water from glacier-fed streams, and the shutting-off of the sun's rays from the narrow passages by their mountainous shores and prevalent fogs, is markedly of a more boreal character" than the ocean coast. New species are described in the genera, *Leda*, *Bela*, *Mangilia*, *Boreotrophon*, *Epitonium*, *Turbonilla*, *Odostomia* and *Bittium*, all figured.

NOTES.

Spondylus echinatus Martyn.—I have recently received from Mr. J. H. Holmes some fine examples of *Spondylus echinatus*, which also rival in size and beauty the *S. pictorum* of the Gulf of California. One of the specimens measures five inches in length, and Mr. Holmes writes that "some are six inches long." They were obtained in ten fathoms near Rock Island, one of the Anclote Keys, Florida.—C. W. Johnson.

Lymnæa auricularia in Ohio.—On March 21st last I found *Radix auricularia* L. in numbers in a marshy stream forming the northeast border of Toledo, Ohio, less than 100 feet from Maumee Bay, Lake Erie. The shells were in two to eight inches of water, moving slowly about on the bottom, upon sticks, and some, afloat at the surface, were in the position of coition. Dead shells of *auricularia* were found also on the marshy borders of a bayou farther to the north. Near this bayou are several greenhouses and I am informed that it is the custom of the florists to import potted azaleas from Holland and Belgium. In this way eggs may have been brought here and reached the open water through drains. The presence of a large colony and the indications that another exists close by would appear to bear out the comment of Mr. Frank Collins Baker, in his recent work upon the *Lymnæidæ*, that "there is no reason why it (*auricularia*) would not thrive in the ponds and rivers of certain favorable localities of this country."

It is an interesting coincidence that that fecund traveler, *Bythinia tentaculata*, is the most common shell to be seen on the mud flats of these two marsh areas.—Calvin Goodrich.

Polygyra monodon cava n. subsp. The shell is larger than *P. m. fraterna;* more openly umbilicate, deeply impressed or excavated around the umbilicus. Parietal tooth short, its ends about equally remote from the terminations of the lip. Fulcrum well developed, notched above and below. Whorls $5\frac{1}{2}$. Pilosity fine and short, about as in *P. m. fraterna.* Alt. 6, diam. 10.5 mm.

Types No. 90127 A. N. S. P., from Cazenovia, Madison Co., N. Y., collected by Messrs. Henderson, Walker, Clapp and Pilsbry, 1905.

A recent review of specimens in the collection of the Academy of Natural Sciences shows the existence of a rather large and openly umbilicate race in the Transition Zone, from Maine to Minnesota, extending into Ontario. It coincides in part with the range of *P. monodon* and *P. m. fraterna*, but does not extend so far south. It intergrades to some extent with *fraterna*, but in most cases the two are readily separable.

In this connection it may be noted that with the exceptions of *P. m. cincta* and *P. m. imperforata*, the several races of *monodon* intergrade more or less. The following races form a series in which each member is connected to the forms immediately following and preceding: *monodon, aliciæ, friersoni, fraterna, cava, cincta.*

Also in the collection of the Academy of Natural Sciences from the following places: Ottawa, Ontario (F. R. Latchford). Maine, Woodland, Aroostock Co., (O. O. Nylander); Knox Co., (N. W. Lermond); Fairfield (J. H. Thomson); Buckfield, Oxford Co., (John A. Allen). Willoughby L. Vermont (A. D. Brown); Mass., (Dr. Mighels); N. Y., Herkimer Co., (A. Bailey); Chittenango Falls; Cazenovia, Madison Co., (H. A. Pilsbry etc.)

Md., Foot hills of Martin's Mt., Cumberland Co., (H. A. Pilsbry & J. Ives). Va., Harper's Ferry, (G. W. Tryon) Mich., Grand Rapids (A. O. Currier); E. Saginaw, (Lathrop) Minn., near Albert Lea, (H. Hemphill); Iowa, Des Moines, (T. Van Hyning); Marshallton, (Rev. R. B. Kendig).

The lowest figures on plate 41 of Terr. Air-breathing Moll. U. S. Vol. III, seem to have been drawn from a specimen of this variety.—*Pilsbry & Vanatta.*

The Nautilus.

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THE DISTRIBUTION OF OAHUAN SPECIES OF AMASTRA.

BY HENRY A. PILSBRY.

The genus *Amastra*, comprising dull ground-snails of Achatinellid type, is found throughout the Hawaiian group from Kauai to Hawaii, but is rather sparingly developed on the two terminal islands, reaching its maximum in the intermediate islands, where special groups have been differentiated. In this intermediate region there have been two main centers of evolution, the one composed of Maui, Molokai and Lanai, the other of the single island Oahu. Common to these two centers are the group *Cyclamastra* (represented by small umbilicate species, like *A. umbilicata*, now mostly extinct), and its derivative *Pterodiscus*.

The two centers are roughly comparable topographically. Oahu consists of two mountain ranges, a western (Waianae range) and a much longer northeastern or Main Range, separated by a lower tract, not forested, and supporting no Amastræ. In the other center, Molokai + Maui represent the Main Range of Oahu, Lanai the Waianae range; only there has been subsidence isolating the component ranges. This may seem an idle analogy; but it was suggested by the facts of molluscan distribution. Lanai by its Amastræ holds such a relation to Molokai as the Waianae range to the western end of the main range; while Molokai, west Maui and east Maui are almost as closely related in their Amastræ as corresponding segments of the Main Range of Oahu, if this was broken by dropping out a few valleys in two places.

Omitting a few species of which the exact locality is unknown, and

for the time ignoring the numerous "varieties" or subspecies, Oahu has 28 species of *Amastra* in the Main Range, 15 in the Waianae Range. Such a proportion seems natural in view of the comparative magnitude of the two ranges. The species fall naturally into five series, which may be called the *umbilicata* series, the *undata*, the *cornea*, the *inflata* and the *spirizona* series.

The *undata* series belongs to the Main Range, especially its eastern half, where it is developed in a great variety of forms. Two of the fourteen species have been found in the Waianae range, one of them, *Amastra albolabris* unchanged, and another represented in the Waianae Range by two varieties of *A. reticulata*, not very different from the presumably parent form of the species in the main range.

The *inflata* series is also wide-spread in the Main Range, but one variable species, *Amastra rubens*, has several varieties in the Waianae range, and one Waianae species, *A. porcus*, is distinct from any in the Main range, though probably related to *A. tristis*.

The small *cornea* series has three species, one of them fossil, in the Waianae Range, and one very rare species, *A. æmulator* Pils., has recently been turned up in the Main Range.

The *spirizona* series comprises seven species in the Waianae Range. *Amastra porphyrea* Nc. is found also in the Main Range, where there is moreover a distinct but related species, *A. porphyrostoma*. *A. spirizona* of Waianae has several varieties in the Main Range—*nigrolabris*, *chlorotica*—and one derivative species, *A. turritella*. The last is the only form which has extended into the eastern end of the Main Range.

In dealing with groups of closely related species in limited areas there cannot be much chance of error in holding that the region of greatest variety and abundance of strictly localized specific forms has been the center of differentiation of those forms. If so, it may be seen that the *undata* and *inflata* series had their rise in the Main Range and the *cornea* and *spirizona* series in the Waianae Range.

To evolve so large a variety of species, many of them strongly individualized, the two ranges must have existed as separate tracts for a long time. It favors this view that fossil forms are found in both ranges. Whether the separation was by water, or by a land surface unfavorable to forest-snails, we have at present no means of

knowing. This long period of separate evolution we further infer, was followed by a brief period of union during which forests extended from the Waianae mountains across the valley to the western part of the Main Range. This connection must have been quite recent, within the life of existing species, for in several cases the same species is found in both ranges. A few forms have been specifically differentiated since the migration, or possibly they may have died out in the original area. At the present time the forests have receded up the mountains, and no migration from range to range is possible. Moreover, there has doubtless been extinction of many forms which once inhabited the lower region.

Most of the migrating species are exceptionally virile forms, shown by their rather wide distribution and tendency to form varieties in their home ranges. Such are *A. spirizona*, *A. rubens*, *A. reticulata*,[1] *A. crassilabrum*.

In the following list of Oahuan Amastræ the Main Range species are given in the left, Waianae species in the right column. A few species of unknown habitat and some named varieties are omitted as unessential.[2] The new names for the latest discoveries of Messrs. Thaanum and Spalding and Dr. Cooke will be defined in the next number of the Manual of Conchology. Names of fossil species are prefixed thus †.

Forms which are believed to have originated in the Main Range are printed in Roman type; those of Waianae origin in *Italics*.

Main Range.	Waianae Range.
(*Series of A. umbilicata.*)	
Sola.	
† Antiqua (Ewa)	? *Heliciformis* Thwing.[3]

[1] *Amastra reticulata* was first named from the derivative migrant in the Waianae Range, instead of from the descendants of the parent stock in the Main Range, a circumstance which might lead to an erroneous idea regarding the origin of the several forms.

[2] *Achatinella elongata* Newc., an Oahuan species, has been omitted for want of a knowledge of the apical sculpture to fix its systematic position. It may be a sinistral member of the *spirizona* group, related to *A. tenuispira*, or it may possibly prove to belong to the group of *A. soror*.

[3] Mr. Thwing has figured as *Amastra heliciformis* Ancey a shell resembling *Amastra agglutinans* Newc., of Maui. It can hardly be Mr. Ancey's species, which belongs to *Pterodiscus* (see Manual of Conchology, pl. 36, figs. 1, 2, 3), and is much more depressed than Thwing's figure. See Occasional Papers B. P. B. Museum, III, no. 1, pl. 3, fig. 17.

Main Range.	Waianae Range.
† Extincta (loc. uncertain).	
† Hartmani (loc. uncertain).	
(Series of A. undata.)	
Textilis.	
Gulickiana.	
Spaldingi.	
† Caputadamantis.	
Pellucida.	
Irwiniana.	
Davisiana.	
Thaanumi.	
Reticulata orientalis.	Reticulata.
Reticulata errans.	Reticulata dispersa.
Cookei.	
Transversalis.	
Albolabris.	Albolabris.
† Vetusta.	
Undata.	
Badia.	
(Series of A. cornea.)	
	Cornea.
	† *Subcornea.*
Æmulator	*Crassilabrum.*
(Series of A. inflata.)	
Rubens kahana.	Rubens.
Rubens infelix.	Rubens corneiformis.
Rubens seminigra.	Rubens castanea.
Tenuilabris.	
Tenuilabris rubicunda.	
Luctuosa.	
Decorticata.	
Inflata.	
Rubida.	
Elliptica.	
Tristis.	Porcus.
(Series of A. spirizona.)	
	Frosti.
Turritella.	*Tenuispira.*
Spirizona acuta.	

Main Range.	Waianae Range.
Spirizona nigrolabris.	*Spirizona.*
Spirizona chlorotica.	
	Intermedia.
Porphyrea.	*Porphyrea.*
Porphyrostoma.	*Cylindrica.*
	Variegata.

THE LAND MOLLUSCA OF SAN MATEO POINT, CALIFORNIA.

BY HARRY EDSON.

San Mateo Point is a heavily-wooded knoll containing about one and one-half acres of ground, on the San Francisco bay coast midway between San Mateo and Burlingame. It is practically an island as far as the land mollusca are concerned, being entirely surrounded by water and salt marsh with the exception of a wagon road that during the rainy season, the only time the snails travel in California, is covered with water most of the time, so that there has been no very recent addition to the molluscan fauna, which is rather large considering the area of the collecting ground, and that the nearest place any molluscs are found is over three miles away with the town of San Mateo and the salt marsh intervening.

List of Species.

Epiphragmophora arrosa, Gould, found in large numbers on the western or bay side exposure. I was unable to find any on the opposite side.

This species showed a very great variation, running from a very dark shell with no superior color band to a light-colored shell with dark band, also an albino form some without any band and others banded, one of the latter had a bright orange band.

Epiphragmophora nicklíniana, Lea. This shell was found rather sparingly, buried under the debris in some small water channels running from the center of the point.

Circinaria vancouverensis, Lea, a few specimens found on the west side.

Circinaria duranti, Newc., found on a little hill in the center of the point that the Indians had evidently used as a place to hold clam bakes.

Punctum conspectum, Bland, found in large numbers around the roots of the Eucalyptus trees on the east side.

Zonitoides minuscula, Binney, found at the roots of the Eucalyptus trees.

Mr. E. W. Gifford[1] reported finding *Epiphragmophora fidelis*, Gray, at San Mateo Point, but I regard this as erroneous as the farthest south it is known is the form *infumata*, Gould, found as far south as Santa Rosa. As there is no land connection between there and San Mateo Point, the only explanation would be that they were washed into the bay on a log or a tree and drifted to the point; but this is highly improbable, as they would have to stand immersion in the salt water for many days, and I am positive that it does not occur there now, so it is quite probable that he mistook one of the light forms of *Epiphragmophora arrosa*, Gld., for *fidelis*, Gray.

NOTES ON OREOHELIX.

BY L. E. DANIELS.

During the fall of 1909 in company with J. H. Ferriss, I collected snails in the Kaibab Mountains and the Grand Canyon of the Colorado. *Oreohelix strigosa depressa* Ckll. was the most abundant species north of the canyon, *O. yavapai* Pils., on the south side.

A few notes may be of interest to the readers of THE NAUTILUS.

Oreohelix is viviparous, and when cleaning the shells if I observed one that was gravid I made note of the number and color of the embryos.

The first *Oreohelix s. depressa* collected was on August 28th on Powell Plateau, and when cleaned nearly one-third were found to be gravid, with from four to eight young in each shell, the young consisting of from one and one-half to two and one-half whorls; all of the adult shells were brown with dark bands, and the young were all brown. Very few of the embryonic shells show bands and then only a faint trace.

The last station, Spectacle Cove in the Grand Canyon, was collected on October 23d, the number taken was 456 *O. yavapai*. Only ten were gravid, or one in forty-five. Six of these contained two, three contained three and one four embryos. This lot was

[1] NAUTILUS, XIV, page 144, 1901.

hibernating and was not cleaned until January 15th after returning home. Of this lot of ten shells, six were brown with darker stripes, and four were white or albino. Five of the brown shells contained brown embryos of from two to three in each, the other brown shell contained three *brown* and one *white;* two of the white contained two *brown* each; one white contained two *brown* and one *white*, and the remaining white one contained two *white.* Whether the small number in each shell of this lot tends to show that a portion of the embryos may have been extruded and the remainder would have been carried until the returning spring, I cannot say, or it may be that this particular colony would not produce as many young, as the adult shells are not more than two-thirds the size of those from most of the other stations.

At a station in Quaking Asp Canyon, Kaibab Mountains, four of the shells of *Oreohelix strigosa depressa* were gravid, three brown with dark bands and one white. One brown shell contained five *brown;* one brown contained nine *brown;* the other brown shell contained three *brown* and two *white*, and the white shell contained five *brown* and two *white* embryos. These shells were hibernating, and they were collected on October 14th and opened January 15th, 1910.

At twelve stations taken at random the number of young ranged between five and twelve from each shell. One shell from another station contained twenty embryos. All of the shells taken at these thirteen stations were brown with dark bands and the embryos were all brown.

In this connection I might say that in the fall of 1907 I collected in the Huachuca Mountains. The species of Oreohelix there being *strigosa concentrata* (Dall) and *strigosa huachucana* (Pils.). I did not see a single albino and none among the embryos.

Query: In the light of the above notes what is to be done with varieties *alba* and *rubra* among the species of snails.

A GIANT ADMETE FROM BERING SEA.

BY WILLIAM H. DALL.

Among the collections made by me more than thirty-seven years ago in Bering Strait and at Plover Bay on the Siberian side of the

Strait a number of species of shells were procured, some of which are widely distributed in the boreal seas while others are local. Many of the specimens were exceptionally large, larger than others of the same species collected elsewhere. In sorting the material, which has been all these years in alcohol, a remarkable new species of *Admete* was found, of which the description follows:

ADMETE REGINA n. sp.

Shell large, solid, white, with a coffee-colored periostracum and five or more whorls, the apex in every case being more or less eroded; spiral sculpture of fine, even-channeled grooves with flattened or even slightly concave wider interspaces, covering the whole shell except a space between the suture and the shoulder of the whorls; there are about two grooves and an interspace to a millimeter; axial sculpture of a few feeble often more or less obsolete, irregular, low plications, not quite reaching the middle of the whorl; suture very deep but not channeled; whorls moderately rounded; base attenuated, with a narrow, deep umbilical perforation; outer lip simple, hardly thickened, throat white, smooth, body with a smooth, white layer of callus; pillar concavely arcuate, with six or more feeble plaits, the anterior end of the pillar projecting over a deep notch.

Height of shell 36, last whorl 27, of aperture 20, max. diam. 22 mm.

Type No. 221473, U. S. N. Mus.; dredged in Plover Bay in 25 fms., hard bottom, by W. H. Dall in 1874.

THE CLASSIFICATION OF THE EUROPEAN NAIADES.

BY DR. A. E. ORTMANN.

(*Concluded from page 7*).

I have divided the family *Unionidæ* into three subfamilies, only two of which are found in Europe (compare: Nautilus, 23, Febr. 10, p. 114–120).

Subfamily: UNIONINÆ Swainson (restr.)

Supraanal opening rarely not separated from the anal, generally well separated. Marsupium formed by all four gills, or only by the outer ones, when charged only moderately swollen, and its edge not

distending. No secondary watertubes developed within the marsupium. Glochidia rather small, either semioval or semielliptic, without hooks, or subtriangular, with hooks.—These forms have a short breeding season.

The typical genus is *Unio* Retzius, of which the European species *Unio pictorum* (Linnæus) is the type.

Unio pictorum (Linnæus). A large number of specimens is at hand, from various parts of Germany and Hungary, representing several "forms."

The anatomy is typical for the family: the supraanal is well separated from the anal by rather long mantle-connections. The marsupium is formed by the outer gills alone, and according to the structure of the edge of the gill, it does not seem capable of distending, when charged.

No gravid females are at hand, but according to various authors, the breeding season is short, and the glochidia are subtriangular, with hooks.

This latter character distinguishes the European genus *Unio* from the genus bearing the same name in North America. In addition, in the latter, the mantle-connection between the anal and supraanal is generally shorter, and the shell chiefly the beak sculpture, is fundamentally different. Thus we cannot place the North American species in the same genus, and I have concluded to use for them the name *Elliptio* Rafinesque.

Unio tumidus Retzius (about 10 specimens from Germany and Hungary at hand); *U. crassus* Retzius (many typical specimens from Thuringia), and the probably conspecific forms: *batavus* Maton & Racket (5 specimens from Germany and Hungary), and *consentaneus* Rossmaessler (one male from Bavaria), have essentially the same anatomical structure as *U. pictorum*. A specimen of *U. batavus* from Hungary had the outer gills partly filled with eggs. No lateral water-tubes were observed.

Subfamily: Anodontinæ Ortmann.

Supraanal always well separated from the anal opening, generally by a very long mantle-connection. Marsupium formed only by the two outer gills, when charged greatly swollen, and an extra thickness of tissue at the edge permits them to distend. Within the watertubes of the marsupial gills, lateral (secondary) water-tubes, lying

toward the faces of the gill, are developed during the breeding season, while only the central part of each original water-tube is used as ovisac. The ovisacs are closed also at the base of the marsupium. Glochidia rather large, subtriangular, with hooks.—These forms have a long breeding season.

Also of this subfamily, the typical genus is European, and the type-species is *Anodonta cygnea* (Linnæus) of Europe.

Anodonta cygnea (Linnæus). I have a large number of specimens, of both sexes, the females sterile or gravid, with eggs as well as with glochidia, in my hands. They represent various forms of this polymorphous species (*piscinalis*, *fluviatilis*, *anatina*, *cellensis* etc.), but I agree with certain European writers in regarding them all as *one* species. At any rate, in the anatomical structure, they are all alike.

The soft parts of this species correspond to the characters given for the subfamily above in every detail, and it is not necessary to describe them again, except to make the statement that the anal and supra-anal openings are separated by a very long interval. It may also be mentioned that I possess slides of this species, which show the formation of the lateral water tubes of the marsupium most beautifully, rendering it beyond doubt that these tubes are actually cut off from the original water-tubes.[1]

Anodonta complanata Rossmaessler. I have six specimens from Bavaria, among them two males, one sterile, and three gravid females, the latter with glochidia.

The structure of the soft parts is absolutely like that of *A. cygnea* in all essential points. For this species the genus *Pseudanodonta* has been created by Bourguignat, which recently has been taken up as valid by Haas (Najadenfauna des Oberrheins, in: Abh. Senckenberg. Naturf. Ges. 32, 1910, p. 170, and Pr. Malacol. Soc., g., 1910, p. 110). The characters originally given by Bourguignat, and added to by Germain (see Haas), are taken from the shell, and, aside from the compressed shape of the latter, are entirely *imaginary*. Later on, the shape of the glochidia was added (Schierholz) as a further difference, and (by Clessin) the structure of the gills, in terms which

[1] An epithelial fold each on two opposing faces of two septa grows into the lumen of the water-tube, and these two folds come into contact. In this species I have not seen them firmly united, as in other species, although this undoubtedly will be the case when they are fully developed.

are hard to understand, and the meaning of which can only be guessed. The latter were referred to by subsequent writers by the mysterious words that there are "anatomical" or "histological" differences. My own investigations have convinced me that all anatomical or histological elements in the gill-structure of *A. complanata* are essentially the same as in *A. cygnea*, the only actual difference being a slighter development of the interlamellar tissue in *A. complanata*. And further, the shape of the glochidium is indeed slightly different, that of *A. cygnea* being a little larger, and higher in proportion to length. For the rest, *A. complanata* is absolutely like *A. cygnea*, and the general shape of the shell, chiefly the conformation of the beaks and their sculpture, indicates clearly that *A. complanata* is not only a true *Anodonta*, but also belongs to the same group of the genus, of which *A. cygnea* is the type (as distinguished, for instance, from the North American group of *A. grandis*). The very slight differences in the anatomy alluded to above, and in the glochidium, cannot be regarded as of more than specific value. *Pseudanodonta*, consequently, is a synonym of *Anodonta*, and I must confess that I rarely have come across a more useless and superfluous genus.

I hope to find occasion, in the future, to give a more detailed and illustrated account of the European forms discussed here, and very likely shall do so in connection with my studies of the soft parts of a number of North American forms, in which I am now engaged.

PUBLICATIONS RECEIVED.

The Recent and Fossil Mollusks of the Genus Cerithiopsis from the West Coast of America. By Paul Bartsch (Proc. U. S. Nat. Mus., vol. 40, May 8, 1911). Former work on the forms is reviewed, followed by a classification of the species into the subgenera *Cerithiopsis* proper, *Cerithiopsina*, *Cerithiopsidella* and *Cerithiopsida*, based upon characters of the embryonic and early neanic whorls. Of 44 species known from the west coast of North and South America, five occur only fossil, and 25 are described as new. All the species are illustrated by photographic figures. It is an important work on a difficult and hitherto little-known genus.

New Species of Shells from Bermuda. By W. H. Dall

and Paul Bartsch (Proc. U. S. Nat. Mus., vol. 40, May 8, 1911). The new forms are :

Mitra haycocki.
Columbella somersiana.
Aclis bermudensis.
Turbonilla bermudensis.
Turbonilla peilei.
Turbonilla haycocki.
Cerithiopsis movilla.
Cerithiopsis ara.
Cerithiopsis pesa.
Fissuridea bermudensis.
Odostomia nioba.
Ischnochiton bermudensis.

Columbella somersiana is a remarkably large form of the *Mercatoria* group, described from an immature shell 24 mm. long. All the species are well illustrated.

Bibliography of the Scientific Writings of R. E. C. Stearns. By Miss Mary R. Stearns; with biographical sketch by William H. Dall (Smithsonian Misc. Coll., vol. 56, no. 18, 1911). 156 papers are recorded as published during a long life of varied scientific activities, 111 relating to Mollusca, the others divided between Cœlenterata, Agriculture, Forestry, Ethnology, et cetera. Many of Dr. Stearns's shorter articles were published in the Nautilus. A good portrait, probably sat for about 1895, illustrates this paper, which will be especially useful to those working with west coast mollusks.

NOTES.

Note on Lymnæa florissantica. In his very valuable work on the Lymnæidæ, Mr. F. C. Baker has made a curious error in reference to *Lymnæa florissantica.* I sent him a photograph I happened to have representing the cast of the body whorl of the type, in the American Museum of Natural History. Through some misunderstanding, he figured as the fossil a shadow on the photograph, which accidentally resembles a shell. We have here at the University of Colorado the reverse of the specimen photographed, showing the outline nearly complete, the spire, etc., and also a more perfect but smaller specimen collected since. These confirm my original conception of the shell, and show that it does not at all resemble *L. palustris.* It is proposed to publish good figures in connection with a general account of the fossil land and freshwater mollusca of Colorado, later in the year.

It is worth while to add that *L. florissantica* shows a very strong general resemblance to *Lymnæa pachygaster* (Thomé), which I collected in the Miocene beds at Wangen, Baden, the year before last.

The types of *L. scudderi* and *sieverti* are at the American Museum of Natural History, not at the University of Colorado, as Mr. Baker has it.—T. D. A. Cockerell, *University of Colorado, Boulder.*

THE NAUTILUS.

VOL. XXV. JULY, 1911. No. 3

A NEW LEPTOTHYRA FROM CALIFORNIA.

BY WILLIAM H. DALL.

Mr. C. W. Gripp, of San Diego, Cal., recently obtained from a fisherman a stone hauled up on a fishing-line from the rock-cod banks off the entrance to San Diego harbor, in 100 to 150 fathoms. On this stone, beside corallines, annelids, etc., were several mollusks, *Placobranchus* (*Oscaniella?*) *californicus* Dall, *Crepidula nummaria* Gould, a *Saxicava* and two specimens of a *Leptothyra*, which is undescribed and markedly different from any other species of that genus known to the Coast. Both specimens were immature, but the older one lacks merely the thickening of the aperture which comes with maturity. Both contained the operculum.

Leptothyra grippii n. sp.

Shell small, solid, of about five whorls; the apex slightly flattened, nepionic whorls one and a half, small, nearly smooth, whitish; sculpture on the spire on the second whorl three, increasing to five on the last whorl, strong, prominent, squarish spiral cords, articulated in the type with crimson and white, the interspaces at first smooth, on the later whorls with one to three intercalary much smaller spiral threads; on the last whorl between the peripheral cord and the next posterior cord five uniform fine threads, though this feature is probably variable; base flattened, translucent white, with one articulated crimson and white color band around the umbilical region, which is also white; pillar broad, white, with one prominent knob of callus in the middle of it; throat brilliantly pearly; the whorl is laid slightly above the

peripheral cord, which is covered by the advancing whorl; body color crimson; faint spiral striæ on the flattened base; axial sculpture only of incremental lines. Height of shell 5.25; of last whorl 4.0; max. diameter 6.0 mm. Operculum as usual in the genus, with about three whorls.

THE MOLLUSCAN FAUNA OF NORTHAMPTON COUNTY, PENNSYLVANIA.

BY G. W. CAFFREY.

So far as is known to the writer no list of the mollusca of this county has been published up to this time. The species named in the following list have been found within the county, and nearly all occur in the vicinity of Bethlehem, as well as in other localities explored.

Helix appressa Say, described by Hartman in "Conchologica Cestrica" as occurring "under flat stones on the Lehigh River," has not been found by the writer, though diligently sought along that stream from Bethlehem to its confluence with the Delaware River at Easton.

The physical conditions in the Lehigh Valley and adjacent lands are favorable to the development of the shell-bearing mollusca, limestone being abundant, and the waters strongly impregnated with that mineral. The limestone cliffs, old quarries and abandoned limekilns found on nearly every farm, afford good collecting ground for *Helicidæ* and *Pupillidæ*.

Limacidæ.

Limax maximus L. Bethlehem.

Limax agrestis Müll. Bethlehem, W. L. King.

Limax campestris Binn. Bethlehem.

Zonitidæ.

Gastrodonta gularis Say. One specimen in drift on Monocasy Creek.

Gastrodonta suppressa Say. Monocasy Creek.

Zonitoides nitida Müll. Bank of Monocasy Creek.

Vitræa cellaria Müll. Rare, West Bethlehem, bank of Monocasy Creek, W. L. King.

Zonitoides arborea Say. Common.

Vitrea indentata Say. Uncommon, Bethlehem.

Vitræa viridula Mke. (*radiatula* Alder). Rare, Bethlehem.

ENDODONTIDÆ.

Pyramidula alternata Say. Common, Bethlehem. Specimens of a creamy-white, lacking the usual markings, have been found on the Monocasy Creek.

Pyramidula striatella Anthony. Common, Bethlehem.

Helicodiscus lineatus Say. Quarries and limey situations, Bethlehem.

HELICIDÆ.

Polygyra (*Mesodon*) *thyroides* Say. Frequent, Bethlehem.

Polygyra (*Mesodon*) *albolabris* Say. Common, Bethlehem.

Polygyra (*Triodopsis*) *tridentata* Say. Common, Bethlehem.

Polygyra (*Triodopsis*) *introferens* Bland. A single specimen (not *inflecta*), Bethlehem.

Polygyra (*Stenotrema*) *monodon fraterna* Say. Common, Bethlehem.

Polygyra (*Stenotrema*) *hirsuta* Say. Common, Bethlehem.

Vallonia pulchella Müll. Common, Bethlehem.

Vallonia costata Müll. Not common, Bethlehem.

PUPILLIDÆ.

Pupa armifera Say. Very common, Bethlehem.

Pupa marginata Say (*fallax* Binney). Numerous in one locality, Bethlehem.

Pupa contracta Say. Common, Bethlehem.

Pupa pentodon Say. One or two specimens, Bethlehem, W. L. King.

Pupa corticaria Say. Under bark of dead willow tree, Monocasy Creek, rare, Bethlehem.

Vertigo ovata Say. Rare, Bethlehem.

Vertigo milium Gould. Two specimens, Bethlehem.

FERUSSACIDÆ.

Cochlicopa lubrica Müll. (*Ferussacia subcylindrica* Auct.). Under decaying leaves, woods north of Bethlehem.

Caecilionella acicula Müll. Lehigh Mountain, contiguous to Fountain Hill Borough, spreading from greenhouses; also found by Mr. W. L. King in his yard in Bethlehem.

SUCCINEIDÆ.

Succinea obliqua, Say. Common, Bethlehem.
Succinea avara Say. Damp meadows on Monocasy Creek.

PHILOMYCIDÆ.

Philomycus carolinensis Bosc. Freemansburg, Pa.

AURICULIDÆ.

Carychium exiguum Say. Bethlehem.

LIMNAEIDÆ.

Limnaea catascopium Say. Monocasy Creek, unusually large specimens taken, measuring, length 26, diam. 15 mill.
Limnaea desidiosa Say. Monocasy Creek.
Planorbis bicarinatus Say. Lehigh and Delaware Rivers, common.
Planorbis campanulatus Say. Lehigh River, not common.
Planorbis deflectus Say. Canal and pond, Bethlehem.

ANCYLIDÆ.

Ancylus rivularis Say. Delaware River, Easton, Pa.

PHYSIDÆ.

Physa heterostropha Say. All streams.
Physa ancillaria Say. Monocasy Creek.

VALVATIDÆ.

Valvata tricarinata Say. Monocasy Creek, common.
Valvata bicarinata Lea. Pond, Bethlehem.

AMNICOLIDÆ.

Amnicola decisa Hald. Canal, Bethlehem.
Amnicola granum Say. Lehigh River.
Somatogyrus altilis Lea. Lehigh River.
Pomatiopsis lapidaria Say. Monocasy Creek, not common.

VIVIPARIDÆ.

Campeloma decisum Say. Lehigh River and Monocasy Creek common.
Lioplax subcarinata Say. With the preceding species, common.

PLEUROCERIDÆ.

Goniobasis virginica Gmel. Shells badly eroded in the Lehigh River, but perfect and large among rocks at the mouth of Monocasy Creek.

SPHÆRIIDÆ.

Sphærium simile Say. Mouth of Monocasy Creek, common.

Sphærium striatinum Lam. Saucon Creek (W. L. King).

Pisidium virginicum Gmel. Lehigh River, Delaware River (King).

Pisidium compressum Prime. Lehigh River.

UNIONIDÆ.

Unio complanatus Sol. Lehigh and Delaware Rivers, common.

Unio ochraceus Say. Delaware River, common.

Margaritana marginata Say. Delaware River, common.

Anodonta fluviatilis Lea. Lehigh Canal; also ponds in the vicinity of Bethlehem.

NEW FLORIDA UNIO.

BY L. S. FRIERSON.

No very clear idea of the *Unio coruscus* could exist because it has never been figured. Through the courtesy of Mr. Van Name, of the State Museum of New York, an accurate photograph of the type shell is herewith given to readers of the NAUTILUS (Plate I, figs. 1, 2, 3).

Mr. Van Name having also kindly compared suites of Florida *Uniones* with Gould's shells (three in number), an undescribed shell has been found which is herewith described.

UNIO TENUISCULUS n. sp. Plate I, figs. 4, 5, 6.

Shell transversely elliptical, rather solid, quite small, being the smallest member of the great *buckleyi* group yet published; smooth, eradiate (except when quite young), brown-olive, shining on the sides, the posterior area rough and dull; dorsal and basal margins nearly parallel (the former a little arched in some examples). Posterior point low and widely biangulate; truncate in front. Nacre purple and salmon-colored. Teeth double in left, single in right valve, quite stout. Length 36½, alt. 20, diam. 14½ mm.

The shell is differentiated from *U. coruscus* by being smaller; by its parallel outline; by its posterior point being lower and more biangular. In proportion to size, it is heavier in texture, and when perfect shells of both are compared, it is *not so shining* as is *coruscus*. The squarely built anterior end is a character common to a number of Florida *Uniones*.

The habitat is Reedy Lake, Polk Co., Florida, in the Gulf drainage. Specimens in cabinets of Mr. Bryant Walker, of the Academy of Natural Sciences of Philadelphia, and in my own.

A plate illustrating the type of *U. coruscus* Gld. and this species will appear in the next number.

NOTE ON THAIS (PURPURA).

BY MRS. M. BURTON WILLIAMSON.

Having recently received a fine series of American *Thais* or *Purpura* from Mr. Henry Hemphill, the well-known student of variation in shells, it occurred to me that his notes on these shells would be of interest to the readers of the NAUTILUS. The shells, comprising over fifty varieties of form, sculpturing, color, etc., were collected by Mr. Hemphill on the coast of Maine, Puget Sound, Washington, Oregon and California.

As the earlier readers of the NAUTILUS are aware, Mr. Hemphill takes one species as the type of a group, and around this type he places other species as types of varieties.

Many years ago P. P. Carpenter and George W. Tryon[1] noted the strong resemblance between *Purpura lapillus* L. of the eastern coast of North America, and *P. saxicola* Val. of the Pacific shore. Mr. Hemphill, while agreeing with them, would group our west coast species around *P. lapillus* L. as the progenitor of the whole series. He compares shells he collected on the coast of Maine with *P. saxicola* of the west coast, and a tray of these shells are, as he says, "almost identical in every respect with Tomales Bay, California, specimens." These selected specimens are puzzling indeed when we consider the geographical area from which they were collected.

[1] Manual of Conchology, Vol. II.

Mr. Hemphill's conclusions, as shown in the study collection received from him, would be, in the grouping of the west coast *Thais*, as follows: *Purpura lapillus* L.; var. *ostrina* Gld., *P.* var. *emarginata* Desh., *P.* var. *saxicola* Val., *P.* var. *lima* Mart., *P.* var. *septentrionalis* Rve., and *P.* var. *crispata* Rve. Variations, globose, banded, etc., and color-variations very naturally are grouped under each named variety, and present a series of variations typical of the painstaking that has always been accorded this veteran conchologist of the Californian coast.

FURTHER NOTES ON ASIATIC VIVIPARAS IN CALIFORNIA.

BY HAROLD HANNIBAL.

In The Nautilus, V, 1892, p. 114 and VI, 1892, p. 51, W. M. Wood reported *Paludina japonica* from the Chinese markets of San Francisco. The writer has had an opportunity to examine some of these specimens in the collection of W. S. Raymond, and they prove to be *Viviparus malleatus* Rve., having been compared with *malleatus* received under that name from Frederick Stearns at a time when the Japanese Viviparas were was less known than at present. Stearns (Nautilus, XV, 1901, p. 91) reported *V. stelmaphora* (= *malleatus*) sent by Mrs. A. E. Bush, a shell enthusiast now dead, "from seven or eight miles from San José" (probably in the Artesian Belt), and "a little valley at the foot of Mount Hamilton." The latter locality is probably erroneous; it has not been verified, and the specimens seem to have passed through several hands. In 1908, the writer (Nautilus, XXII, p. 33) noted *V. lecythoides* from the Artesian Belt between San José and San Francisco Bay. Comparison with specimens from Nagasaki, Japan, proves this also to be *malleatus*, and it is figured under that name in the 1910 edition of West American Shells, Pl. iii, fig. 8.

It is abundant at a number of points in the Artesian Belt since this was at one time an extensive berry district where celestials were employed. The species was brought from Yokohama and originally planted between Alameda and Centerville to supply the markets about San Francisco Bay where they bring 20 cents a dozen according to Wong, a Chinese merchant, whence colonies have been dis-

tributed to a number of points in the Sacramento-San-Joaquin Valley as well. This is verified by specimens from an irrigating ditch near Fresno received from C. E. Jenney. It may be expected to turn up elsewhere.

A few days ago on a visit to the Coalinga Oil Fields a lengthy wait at Hanford was necessary to make train connections. While other passengers sat about with bored expressions or searched the town for amusements, the writer welcomed it as an opportunity to go forth in search of the elusive snail and walked out of town about half a mile east to a dry irrigating ditch. This had recently been prolific of molluscan life, and while scratching in the dried weeds for *Pisidia* a specimen of another *Vivipara* was found. *Pisidia* were forgotten and a systematic "muckraking" of every weed up and down the ditch for a hundred yards was only interrupted by the roar of the coming train. The spoils proved to be *Vivipara japonica* Mart., a number of which were still alive, though the ditch from all evidences had been dry for months.

V. japonica may be readily distinguished from *malleatus* by its sharper more acute spire, flatter whorls and fine spiral striae instead of the four lines of revolving punctures. The carinate base is usually retained throughout life while in all introduced *malleatus* seen it becomes obsolete before maturity is reached.

The Japanese, who are also fond of these, call them Tanisha or rice snails.

Pilsbry and Johnson (NAUTILUS, VII, 1894, p. 144) note that Taylor reports *Paludina japonica* (= *Vivipara*) from the Chinese markets of Victoria, B. C.

NEW JAPANESE NATICIDAE AND SCALARIIDAE.

BY HENRY A. PILSBRY.

Polinices pila, n. sp.

The shell is umbilicate, globular, with a short, conic spire; brown with lighter streaks, and partially covered with a very thin cuticle, worn from the back, which is somewhat flesh-colored. The surface is smooth except for fine, faint growth-lines which are strongly re-

tractive below the suture, and very faint, fine spiral striæ. Whorls $5\frac{1}{2}$, the earlier ones worn, blue, scarcely convex, the last 2 or $2\frac{1}{2}$ flattened below the suture, then convex; last whorl is somewhat concave below the suture, elsewhere well rounded. The aperture is only slightly oblique, half-circular, brown inside, with a white band within the acute lip, which is built forward near the upper insertion. The columella is white, rather thick, with a very weak, low lobe partially filling the umbilicus, above which a lobe projects angularly forward and is appressed to the shell wall. The parietal wall is almost nude in the middle but has a heavy white callus in and below the posterior angle of the aperture. The umbilicus is narrow.

Alt. 41.5, diam. 35.5 mm.

The operculum is thin, rich chestnut-colored, somewhat concave outside in dry specimens, with the nucleus near the columellar margin, as usual. It seems to comprise about $2\frac{1}{2}$ whorls.

Akkeshi, Kushiro. Cotypes no. 97973 A. N. S. P., and no. 1706 of Mr. Hirase's collection.

This form belongs to the subgenus *Lunatia*. It differs from the young stage of *P. lewisii* by the shape and uniform whiteness of the columellar callus (*pila*, a ball).

Polinices bathyraphe n. sp.

The shell is small, openly umbilicate, globose, white under a thin light yellow cuticle. The spire is very short and low, the early whorls white and worn. The suture is deeply impressed, and in the last whorl conspicuously channelled. The surface is shining, marked with fine growth-lines and minute spiral striæ, which are strongest around the umbilicus. There are $3\frac{1}{2}$ convex whorls, the last very large, flattened and depressed at the suture, elsewhere convex. The umbilicus is large and open. Aperture very oblique, half round, white within. Outer and basal lips are thin and sharp. Columella concave, obtuse and simple below, but above, in the umbilical region, it dilates, forming a small, slightly thickened lobe, to some extent arching over the umbilicus, and adnate above. The parietal wall is very short, white, and heavily calloused throughout.

Length 6, diam. 6.5 mm.; longest axis of the aperture 5.3 mm.

Fukura, Awaji, Cotypes no 97974 A. N. S. P., and no 1676 of Mr. Hirase's collection.

A miniature *Polinices*, resembling *P. montagui* Forbes and *P. pallida* B. & S., but very distinct by its conspicuously excavated suture (*bathyraphe*, deep suture.)

SCALA STIGMATICA n. sp.

Allied to *S. maculosa* Adams & Reeve. The shell is barely rimate, white, marked below the periery with oblique oval brown spots in each inter-lamellar space, and sometimes with a few faint ones above the perifery. These spots are not sharply defined, but fade at their edges. The spire is straightly conic; embryonic whorl or whorls wanting in the specimens seen. Succeeding whorls are well rounded, separated by deep sutures. The last one or one and a half whorls are so deeply separated that they seem to be in contact only at the ribs. There is a very minute sculpture of fine, close, unequal engraved spiral lines in the intercostal spaces. The ribs are rather low and narrow, without points at the shoulder, or with them very indistinct; at irregular intervals there are larger, heavier ribs. Each of the last two whorls has eight ribs. The aperture is oblique, short-oval; peristome continuous, with a strong lip-varix.

Length 24, diam. 8½ mm.; whorls remaining 9¼.

Length 20½, diam. 8½ mm.; whorls remaining 10.

Fukura, Awaji, Japan. Cotypes no. 88318 coll. Acad. Nat. Sci. Phila., from no. 1571 of Mr. Hirase's collection.

This species was determined as new in 1904, and was sent out under the above name by Mr. Hirase. Subsequently I thought it might be a form of *S. maculosa* A. and R., and the description was therefore withheld. Mr. G. B. Sowerby, who received specimens from Mr. Hirase, has kindly informed me that it is quite distinct. *S. stigmatica* is "much larger than *S. maculosa*, whorls more rounded, ribs more distant, and not at all angular or aculeated" at the shoulder.

(*To be continued.*)

LAND SHELLS OF ATLANTIC CITY, NEW JERSEY.

BY H. A. PILSBRY.

During August, 1909 and May, 1910, the writer spent two or three afternoons exploring certain small groves or copses standing in

the midst of the salt marshes which separate the coast islands from the mainland of New Jersey. Those visited lie perhaps a half mile out on the salt marsh from the inside or north shore of Ventner, a suburb of Atlantic City. They are elevated a few feet above the level of the surrounding marsh, and support a varied association of plants. In one place a single large holly tree stands in a thicket of low shrubs, poison ivy, etc., the whole only a few rods in extent. Here were found

Polygyra albolabris maritima (Pils.).
Vallonia perspectiva (Sterki).
Helicodiscus parallelus (Say).
Zonitoides arborea (Say).
Zonitoides minuscula (Binn.).
Cochlicopa lubrica (Müll.).
Pupilla muscorum (L.).
Bifidaria contracta (Say).
Bifidaria pentodon (Say).
Vertigo milium (Gld.).

This place, on a subsequent visit, was found deeply buried in sand, drifted from the surrounding area of made land, where it has been pumped out of the inlet.

Further eastward, and separated from the preceding by about half a mile of salt marsh, there is a narrow but rather long and sparse grove or copse of cedars, with dense underbrush of wild rose, poison ivy, sumac, grape, pokeberry, etc., etc. This is directly opposite Vassar Place, Ventner, and perhaps a half mile out in the marsh. Here were found:

Vallonia perspectiva (Sterki).
Zonitoides minuscula (Binn.).
Zonitoides arborea (Say).
Cochlicopa lubrica (Müll.).
Pupoides marginata (Say).
Pupilla muscorum (L.).
Bifidaria contracta (Say).
Bifidaria pentodon (Say).

In another place near by the same species were found with the addition of *Vertigo milium* Gld. and the shells of *Agriolimax*.

It is not easy to say how these snails reached such isolated spots, especially since few if any of them are to be found in the interior of New Jersey. The occurrence at sea level of such northern forms as *Pupilla muscorum* and *Cochlicopa* is anomalous. With them there is one distinctly southern species, *Vallonia perspectiva*, never before reported from New Jersey or any other point of the Atlantic coastal plain.

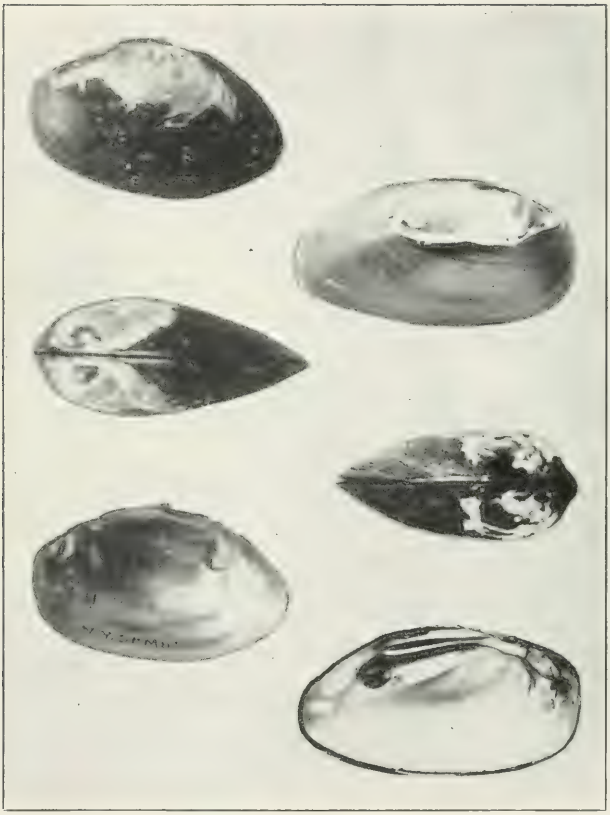
PUBLICATIONS RECEIVED.

Reports on Mollusks.—Two interesting reports on the mollusk fisheries of Massachusetts have been published during the past year by the Massachusetts Commission on Fisheries and Game. The reports represent a three-year investigation of the life, habits and methods of culture of the clam, quahaug, oyster and scallop. The work was done by Mr. David L. Belding, biologist. The subject is treated very thoroughly, with an account of their former natural abundance, historical wastefulness, present conditions and the possibilities of development. "Thousands of acres once productive lie barren, and we have but a remnant of the former abundant yield." Massachusetts fishermen to-day receive an annual income of $685,705 from the shell fisheries, which approximately cover a productive area of 40,000 acres. It is estimated that when the present vast areas are again made productive the value of the annual catch should be increased tenfold.

NOTES.

Chiton aureus Spalowsky, Prodromus in Systema Historicum Testaceorum (Wien, 1795), p. 88, pl. 13, figs. 6*a*, 6*b*, "Vaterland die Südsee (von der Insel Otaheiti?)" seems to be the common Magellanic *Plaxiphora setigera*, and is the oldest name for that species. It is described in a rare book, recently acquired by the Academy of Natural Sciences, and which I do not remember to have seen referred to in any other work. The figures are excellent in drawing and beautifully colored, much like those of Born. Most of them represent well-known species of Linnæus and Gmelin.—H. A. Pilsbry.

Note on Lampsilis discus (Lea.)—It may be worth while to record a *lapsus pennæ* in the reference to this species in Mr. Simpson's Synopsis of the Naiades, p. 705. Figure 310, plate LXII, of the Conchologia Iconica, of Sowerby, is there cited by Mr. Simpson under *L. discus* Lea. That figure really represents *U. crassidens* Lam., as noted by Simpson himself on page 707 of the Synopsis. The true *L. discus* Lea being shown in the Conchologia Iconica by a fine figure under the name of "*Unio mexicanus* Sowerby."—L. S. Frierson.



Figs. 1, 2, 3. Figs. 4, 5, 6.

1, 2, 3 UNIO CORUSCUS GOULD, TYPE. P. 29.
4, 5, 6. UNIO TENUISCULUS FRIERSON, COTYPES. P. 29.

The Nautilus.

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CORRESPONDENCE FROM BRAZIL.

BY FRED. BAKER.

Natal, Brazil, *May* 30, 1911.

As I have a chance to get letters away to-morrow, and as I have a little breathing spell this afternoon, I will give you an idea what we have been doing since reaching Brazil.

Unfortunately, we lost much time in Ceará waiting for the way steamer to bring us to this smaller port, and as the vessel was expected from day to day we did not unpack our outfit, so our work was not carefully done.

The authorities have been most considerate, admitting our things without duties, and in every way facilitating our work. At Ceará we were taken in a special train to Quixadá—164 kilometers—where the largest dam in Brazil is located. It is a surprise to all of our party who are new to the country to find that the States of Ceará and Rio Grande do Norte, making up the northeastern portion of Brazil, have a climate about as dry as that of Southern California and not very unlike it in many other respects. Nowhere did we see the luxuriant tropical vegetation which we were accustomed to in Mexico and Central America. The whole coast is a line of sand dunes, constantly shifting, varied by an underlying sand rock in places, and as far as we went the timber is all small.

The dam at Quixadá is an enormous affair, and owing to the scanty rainfall of the district and the limited watershed, which probably was never carefully estimated, it is much larger than is needed and has never entirely filled.

For two days we were the guests of the railroad and government officials and were royally treated. The train made frequent stops at stations and wherever there seemed any prospects of finding things zoological. Before we reached our destination we had scared the natives by our collection of lizards, toads and snakes, and I had been able to get a few specimens of land shells, to which I have been able to add extensively since. I am unable to determine anything with definiteness, but to date I have collected over a quart of living and dead shells apparently representing Helix, Zonites, Bulimus, Bulimulus, Buliminus, Tomigerus and Stenogyra. In Ceará the number of all except the last was very small, but back of Natal I have found the other genera represented in considerable numbers.

In Natal we were again the guests of the railroad and government officials for a run of 86 kilometers to Baixa Verde, located in the "Campos" country, the great rolling comparatively barren plains of the interior of the State. On the way we passed a single limestone cut furnishing a fine lot of fossils and also representatives of at least three species of living shells. The low, brushy timber through which we ran was largely made up of the Mangabeira, the rubber tree of Southeastern and Eastern Brazil, which at a distance reminds one of a small weeping willow. This, in season, furnishes employment for a considerable number of men, and yields sufficient rubber to show considerable export. For the rest, Cactus, Acacia and similar growths take one back in imagination to the lower parts of Arizona and New Mexico.

Later we were furnished a custom-house steamer for a run of 20 miles down the coast to the little town of Piraugy. Here we dropped into a typical tropical settlement, very primitive and poor, but most interesting. This region is noted for its native pillow lace, and here it was for sale very cheap, so that most of our party invested small sums. We estimated the time spent in making some of it and found the women selling the results of their labor for from two to four cents a day.

I interested the native boys in collecting, and on the shore rocks we got at least one species of Chiton, a small Arca like *solidissima* and a small variety of things not yet determined. On a reef about a mile out I added a few things, but my impression formed here and at Ceará is that the conchological fauna is extremely poor both in number of species and of specimens. I spent an hour dredging at

the boat's anchorage in two fathoms of water and had much difficulty in getting the material aboard as the sand was almost too fine to stay in the dredge net. The material is not rich, but a large handful looked over yesterday yielded a Dentalium, a Turbonilla, and three or four minute Rissoids.

At Ceará I found *Neritina virginea* very common and all along the coast a Cryptogramma is in evidence. Also two species of the Lucinidae, one measuring about two inches across are not rare, as well as several representatives of the Tellinidae, always beach-worn. A day's very careful dredging over some nine miles of the estuary on the side of which Natal is located, ranging from the muddy mangrove swamps above to the shifting sands at the mouth gave very little results, so that I am disappointed in the hope of securing a large collection while here. However, as we shall stay a month longer, I hope to be able to make a useful and fairly full report of what is here. There is a company about to begin work with a couple of deep-sea trawlers, and we have been invited to make ourselves at home aboard as soon as they get to work. This should give me a chance to see just what the bottom offers about this region.

Our original plan to work the coast from this point to Pará has been upset because the only available government boat is too small to carry the necessary supply of coal and water to make the long run between ports where coal can be had, and the owner of the only available sailing vessel demands $3000.00 to take us to Pará, although the trip could be made in a month or six weeks. On this account, and because of the great possibilities which the trawlers offer, we have decided to make a careful survey of this region before moving up the coast.

You asked me to write you of our trip for use in the NAUTILUS. If any of the foregoing seems of sufficient interest for such use you are welcome to use it. As you will see, our plans have been largely changed, but it is the verdict of all concerned that a thorough survey of this region, which has never been worked at all, may yield as valuable results as anything we could do. We have passes over the two railroads, and everything points to efficient work.

Meanwhile we are beautifully located on a hill overlooking bay and ocean; there is a constant breeze from the ocean, and there is no appreciable heat unless one exerts oneself; so we are in for a delightful time, whatever our results may be.

ARKANSAS SHELL COLLECTING.

BY F. A. SAMPSON.

In March of the present year I did some collecting at three places in Arkansas, and below I give the result. The first place was at Van Buren, Crawford county, on the bluff above the town. Here I found only four species.

Bulimulus dealbatus (Say). Two shells were found, both dead ones.

Polygyra appressa (Say). Two dead shells of 17 and 18 mm. There was scarcely an indication of the lamella-like long denticle on the basal margin that is mentioned in the type description.

Polygyra inflecta (Say). One-third of the fifteen shells did not have the umbilicus entirely covered. They were of five whorls and 9 to 10 mm.

Polygyra jacksoni (Bland). At Eureka Springs, Arkansas, this species is of five and one-half whorls, and 6 to 6½ mm.

From various other counties of the State the size is about the same, but from Sebastian county they were larger. The most of those found here, seventy in number, were of 8 mm. and were of decidedly darker color than those from other localities. The same was true of the *inflecta*, but not as notably so. Shells were generally scarce under large single stones, and were found under piles of stones.

II. The next locality was at Winslow, at the north end of the tunnel at the top of the Boston Mountains. The first day I collected on both sides of the valley and gathered a considerable number, including perhaps fifteen *Polygyra edentata*, but by a misunderstanding they were all thrown in the fire. The next day I went over almost the same ground and got the following:

	East side.	West side.
Polygyra perspectiva,	1	15
P. labrosa,	40	77
P. dorfeuillana sampsoni,	5	15
P. edentata,	8	5
P. jacksoni,	15	90
P. neglecta,		20
P. albolabris alleni,		4
P. thyroides,		5
Omphalina fuliginosa ozarkensis,		5

The *alleni* were 24 and 25 mm. in diam., and the larger one of the *thyroides* 20 mm., the others 18 mm. and of less than five whorls. It will be noticed that no *inflecta* were found here.

III. The third locality was two miles north of Brentwood, the first station north of Winslow, at a place on the railroad called by the country people "acorn cut," from the fossil pentremites found there. In the woods near the railroad I got:

P. albolabris alleni, 1 specimen; *P. thyroides*, 2; *P. clausa*, 3; *P. appressa*, 4; *P. neglecta*, 2; *P. edentata*, 6; *P. labrosa*, 4; *P. perspectiva*, 5.

These were all found close to the valley, while at Winslow they were found only high up on the mountain.

Columbia, Missouri.

NEW JAPANESE SCALARIIDAE.

BY HENRY A. PILSBRY.

(*Concluded.*)

Scala kamakurana, n. sp.

Related to *S. turricula* Sowerby. The shell is imperforate, pure white. The spire is straightly conic. First three whorls form a smooth, embryonic shell. Following whorls sculptured with ribs and spiral striæ are well rounded, with deep sutures. The spirals are cord-like, about as wide as their intervals; on the penultimate whorl there are eight. They are wanting on the upper third of each whorl, which is almost smooth. About twelve spiral cords can be counted on the last whorl. The vertical ribs are mostly rather narrow and delicate, slightly recurved, but there are from one to three stronger ribs on each of the last two whorls. Each rib has an angle or a short point above quite near the suture. There are fifteen ribs on the last whorl of a shell 9 mm. long, and seventeen on a slightly larger shell 9.8 mm. long. The ribs are for the most part connected or continuous from whorl to whorl, but in some places they do not connect. Aperture short-oval; columellar margin of the peristome wider than the varix of the outer lip. Length 9, diam. 3.8 mm.; whorls 9.

Kamakura, Sagami. Types No. 70740, A. N. S. P., collected by F. Stearns.

Shorter and broader than the following species, with the shoulder-angles of the ribs nearer the suture.

Scala sagamiensis, n. sp.

This species is closely related to *S. kamakurana*, from which it differs in the following respects: The shell is more slender, sutures deeper. The spiral cords are somewhat stronger, eight or nine on the penultimate, thirteen on the last whorl, the intervals below the suture and above the spirals being smooth. Ribs rather narrow and delicate, with occasional higher ones interposed at irregular intervals. The smaller ribs are either unarmed or but weakly angular above, but the larger ones have distinct points above, further from the suture than in *S. kamakurana*. There are fifteen ribs on the last whorl. The aperture is very shortly-oval. Peristome continuous, the outer varix bearing a point above; columellar margin dilated at the base; parietal callus spreading forward.

Length 11, diam. 4 mm.; whorls remaining 8, the first one smooth, the apical whorls wanting.

Kamakura, Sagami. Type No. 104696, A. N. S. P., collected by F. Stearns.

NEW CUBAN UROCOPTIDAE I.

BY PROFESSOR CARLOS DE LA TORRE.

The species described below were collected by the writer in the northeastern angle of Santa Clara Province, from Remedios to the Camaguay boundary, chiefly in the Sierras near the northern coast, which may be reached from the towns of Remedios, Yaguajay and Mayajigua.

Being *Gongylostomæ*, the species are of the west Cuban type, but they have a particular facies of their own. The prevalence of forms belonging to the section *Esochara* is an interesting feature of this fauna.

Illustrations of all the following species will accompany the concluding paper.

Urocoptis (Gongylostoma) villarensis, n. sp.

Shell rimate, swollen-cylindric, the upper third tapering to a nar-

row truncation ; rather thin ; streaked with white on a pale brown ground. Surface silky, closely subarcuate-striate; suture simple. Whorls 8-9 scarcely convex, the last shortly free in front with a cord-like keel around the base. Aperture slightly oblique, subcircular, slightly narrowed laterally, light brown within ; columellar fold visible deep within ; peristome nearly white, expanded and reflexed throughout, but narrow in the peripheral region. Axis encircled by two subequal compressed lamellæ, the lower denticulate in the upper whorls, and both rapidly enlarged in the antepenult and penultimate whorls, smaller in last whorl.

Long. 22, diam. 6.2, apert. 5 mm. Whorls 9.

Long. 19, diam. 6, apert. 4.8 mm. Whorls 8.

Long. 20, diam. 6, apert. 5. Whorls 8.5.

Central Cuba ; El Purio, near Calabazar de Sagua and El Capiro, near Santa Clara, Province of Santa Clara. A locality also called "Las Villas."

This species obviously belongs to the Subgenus *Gongylostoma*. It approaches *U. obliqua* but differs by its larger size, simple suture and by the wider lamellæ of the axis, etc.

Urocoptis (Gongylostoma) proteus, n. sp.

Shell rimate, cylindric, somewhat swollen, the upper third tapering to a rather narrow truncation ; thin ; brown, marbled with white flames ; surface obliquely rib-striate ; suture sub-crenulate. Whorls 9-11, a little convex, the last purplish, shortly free in front, with an obsolete basal keel. Aperture slightly oblique, subcircular, brown within ; peristome, columella and upper wall white ; peristome expanded and reflexed. Axis encircled by three compressed lamellæ, the lowest denticulate above the middle, moderately expanded in the three last whorls, the others disappearing in the penultimate whorl.

Long. 22, diam. 6, aperture 4.2 mm. Whorls 11.

Long. 17, diam. 5.2, aperture 3.2 mm. Whorls 9.

Long. 20, diam. 6, aperture 4 mm. Whorls 10.

Central Cuba, Sierra de Bamburanao near Seibabo de Yaguajay in the Province of Santa Clara.

Similar to *U. villarensis* but its whorls are more convex with riblets separated by wide intervals, suture subcrenulate and the axis encircled by three instead of two compressed lamellæ.

U. PROTEUS CASTANEA, n. var.

Differs from the type in being of uniform brown, with last whorl purplish. The suture is more distinctly crenulate.

Long. 18, diam. 5.5, ap. 3.3 mm. Whorls 9.

Long. 15, diam. 4.8, ap. 3.2 mm. Whorls 8.5.

Long. 16, diam. 5, ap. 3.3 mm. Whorls 9.

Central Cuba; Colonia Santa Cruz between Seibabo and Yaguajay in the province of Santa Clara.

Differs from *U. remediensis* by the somewhat swollen shell, rapidly tapering to a broader truncation, more solid, and chestnut-colored without whitish spots; rib striate and more crenulate, etc. The axial lamellæ are also somewhat differently disposed.

U. PROTEUS ROBUSTAXIS, n. var.

Shell smaller, cylindric, somewhat swollen, rapidly tapering to a very narrow truncation; somewhat solid; pale chestnut with obsolete whitish clouds; oblique, regularly rib striate; suture not crenulate. Whorls 9–10.5, a little convex, the last one more free. Aperture as in *U. proteus*, typical. Axis tri-lamellate, rather strong and stout in the last whorls.

Differs from the variety *castanea* by its simple suture, more projecting last whorl, stouter axis, and by its color pattern of a few white and chestnut spots on pale brown ground. The last whorl is purple, as in the type.

Long. 18, diam. 4.8, ap. 3.8 mm. Whorls 10.5.

Long. 17, diam. 5, ap. 4 mm. Whorls 9.

Long. 17, diam. 4.7, ap. 3.5 mm. Whorls 10.

Central Cuba; Sierra de Santa Rosa between Remedios and Seibabo de Yaguajay in the province of Santa Clara.

UROCOPTIS (GONGYLOSTOMA) REMEDIENSIS, n. sp.

Shell rimate, cylindric, the upper third (or half) tapering to the truncation; thin; brown with opaque whitish flames. Surface obliquely weakly striate; suture slightly crenulate. Whorls 8-10, a little convex, the last purplish, shortly free in front with a cord-like keel around the base. Aperture slightly oblique, ovate rounded; dark brown within, but the peristome, columella and upper wall nearly white. Peristome expanded and reflexed throughout. Axis encircled by three compressed lamellæ, the lower denticulate in the upper and median whorls.

Long. 16, diam. 4, aper. 3.3 mm. Whorls 9.5.
Long. 14, diam. 3.2, aper. 3 mm. Whorls 8.
Long. 15, diam. 4, aper. 3.2 mm. Whorls 9.
Var. *a*. Somewhat larger and swollen. Whorls 9–11.
Long. 20, diam. 5.2, aper. 4 mm. Whorls 11.
Var. *b*. Chestnut-brown, spotted with white above sutures.
Long. 18, diam. 5, aper. 3.6 mm. Whorls 10.

Central Cuba; Near Remedios; var. "*a*" from El Palenque de Jaguayabon and Cerro de Guajabana; var. "*b*" from near Jaguayabon, all in the Province of Santa Clara.

The complete shell has 17 to 18 whorls with a total length of 20 to 22 mm. The rejected or broken-off portion of the spire is attenuate, delicately striate and with a smooth translucent and bulbous tip.

UROCOPTIS (GONGYLOSTOMA) MAYAJIGUENSIS, n. sp.

Shell rimate, cylindric, the upper half tapering to a narrow truncation; thin; reddish chestnut profusely marbled with white, sometimes in zigzag pattern. Surface densely, obliquely striate; slightly angulate along the suture. Whorls 10 to 11, slightly convex, the last shortly free in front, with a basal, cord-like keel. Aperture slightly oblique, rounded-ovate, brown inside; peristome pale brown, expanded and reflexed. Axis encircled by two compressed lamellæ, the lower being larger in the later and slightly denticulate in the upper whorls.

Long. 23, diam. 5.2, apert. 4.2 mm. Whorls 12.
Long. 19, diam. 4.8, apert. 3.6 mm. Whorls 10.5.
Long. 20, diam. 5, apert. 4 mm. Whorls 11.
Var. "a." Smaller, more swollen, whorls almost flat.
Long. 18, diam. 5.2, apert. 4.2. Whorls 9.

Central Cuba; Las Llanadas, Sierra de Matahambre; var. "a" from Veredas de Aguada y del Alunado, in the district of Mayajigua, province of Santa Clara.

Differs from *U. villarensis* by its more slender and tapering spire, brown color, suture, number of whorls, etc., and from *U. remediensis* by its bi-lamellate internal axis, etc.

The opaque white pattern is confined to the striæ, the intervals being smooth.

U. MAYAJIGUENSIS FULVA, n. var.

Shell smaller, cylindric, more solid; light brown with a golden

gleam; striation coarser. Whorls 9 to 10, somewhat convex. Axis encircled by two compressed lamellæ, the lower more expanded than in the type.

Length 17, diam. 4.8, aperture, 3.5. Whorls 10.

Length 16, diam. 4, aperture 3.2. Whorls 9.

Length 16, diam. 4.5, aperture 3.5. Whorls 9.

Central Cuba; Coqueron del Jatibonico at the boundary between the Provinces of Santa Clara and Camaguay.

Some specimens show faint traces of white maculations.

Urocoptis (Gongylostoma) cioniscus, n. sp.

Shell rimate, cylindric, the upper fourth tapering to a rather wide truncation; somewhat solid; ashen with occasional brown streaks; sculptured with narrow oblique riblets separated by much wider intervals; suture simple. Whorls 9 to 11, somewhat convex, the last shortly free with an obsolete cord-like keel around the base. Aperture sub-circular, pale brown within, the peristome shining white, expanded and reflexed; columella with a distinct fold deep within. Axis bearing two lamellæ, the lower one somewhat the larger, denticulate above the middle and extending to the last whorl, the upper disappearing in the penultimate whorl.

Long. 26, diam. 5, apert. 5.2. Whorls 11.

Long. 24, diam. 5.2, apert. 5.3. Whorls 9.

Long. 25, diam. 5.2, apert. 5.3. Whorls 10.5.

Central Cuba; Cueva del Muerto, Sierra de Meneses in the district of Yaguajay, Province of Santa Clara.

Differs from *U. vignalensis* by its more cylindric and less tapering shell, the brown streaks, absence of granules along the sutures, and the axis encircled by two (not three) compressed and wider lamellæ. (Described from dead specimens).

Urocoptis (Gongylostoma) transitoria, n. sp.

Shell rimate, cylindric, the upper half or third tapering to a narrow truncation; thin; corneous-brown, with occasional stripes of a deeper brown irregularly spread. Surface lusterless, sculptured with narrow riblets separated by wider intervals. Whorls 9.5 to 11, a little convex, the last slightly darker and free in front, rounded below with an obsolete cord around the base. Aperture sub-circular, a little narrower above, brown within; columella, upper wall and

upper half of peristome white. Peristome well expanded and reflexed. Axis encircled by three lamellæ, the lowest denticulate above the penultimate whorl, moderately enlarged in the middle and extending to the last whorl. The upper lamella, compressed at first, becomes cord-like and disappears in the penultimate whorl; the intermediate lamella smallest and thread-like above.

Long. 24, diam. 5.8, apert. diam. 5.2 mm. Whorls 11.

Long. 20, diam. 5, apert. diam. 4.6 mm. Whorls 9.5.

Long. 22, diam. 5, apert. diam. 5 mm. Whorls 10.5.

Central Cuba; Sierra de Matahambre at Las Llanadas, in the district of Mayajigua, province of Santa Clara.

This species is intermediate between *U. cioniscus* and *U. fallax*, but is easily distinguished by its shape, color, and chiefly by the columellar axis.

Urocoptis (Gongylostoma) fallax, n. sp.

Shell rimate, cylindric, the upper third tapering to a rather wide truncation; thin; dull yellowish with occasional irregularly spaced brown streaks. Surface lusterless, sculptured with narrow arcuate riblets separated by much wider intervals. Whorls 9–11, convex, the last purplish brown, shortly free in front, rounded below, with an almost obsolete cord around the base. Aperture nearly round, brown within; peristome, upper wall and columella white. Peristome broadly expanded and reflexed. Axis stout and encircled by three sub-equal compressed lamellæ, the lowest largest in penultimate whorl and smallest in the upper whorls where the upper lamellæ dominate; lower lamella denticulate above.

Long. 25, diam. 6.2, apert. diam. 6. Whorls 11.

Long. 20, diam. 6, apert. diam. 5.6. Whorls 9.

Long. 23, diam. 6, apert. diam. 6. Whorls 10.5.

Central Cuba; Vereda de el Alunado, through the Sierra de Jatibonico in the district of Mayajigua, Prov. of Santa Clara.

Superficially resembling *U. intermedia* but differing chiefly in its more widely spaced riblets and in its axial structure. From *U. transitoria* it differs by its stouter form, sculpture and columellar axis.

Urocoptis (Gongylostoma) dilatata, n. sp.

Shell rimate, cylindric, slightly swollen, the upper third tapering

to the truncation; thin; grayish white, becoming slightly purplish brown on the last whorl. Surface lusterless, sculptured with narrow oblique riblets separated by much wider spaces; whorls 8–9, somewhat convex, the last rounded below with an obsolete cord around the base, very shortly free in front. Aperture large, subcircular or somewhat transversely oblong, a trifle brownish within, the peristome shining white, broadly expanded and reflexed; columella with a distinct fold. Axis encircled by two principal compressed lamellæ, the lower one largest, denticulate above the middle and extending to the last whorl, the upper disappearing to the penultimate whorl; in the median whorls a cord is sometimes interposed, particularly in the ante-penultimate whorl.

Long. 23, diam. 7, aperture diam. 7. Whorls 9.
Long. 20, diam. 6.5, aperture diam. 5.8. Whorls 8.
Long. 22, diam. 6.8, aperture diam. 6. Whorls 8.

Central Cuba; Sierra de Boquerón del Jatibonico at the boundary between Santa Clara and Camaguay Provinces.

The complete shell contains 16–18 whorls with a total length of 24–28 mm. The rejected portion is rib-striate with smooth and somewhat bulbous lip. Differs from *U. fallax* by its color, more enlarged aperture and by the columellar axis.

(To be continued.)

NOTES.

New Color Varieties of Helix (Dentellaria) badia Fér.—There is in my collection a series of *Helix badia* Fér., habitat unknown, which exhibit considerable variation from the type in their coloring. To call attention to their character I may be justified in giving names to these extreme forms.

As Dr. Pilsbry points out in the Manual (Vol. V, p. 86) the type of *badia* is "uniform dark chestnut colored." Between the typical form and the variety I first describe is a transition stage which is represented by an example before me.

Var. *roseolabrum*, n. var. Differs from the type in being much lighter in color and having a rose-colored peristome. Type in my own collection.

Var. *unicolor*, n. var. Distinguished by the light-colored shell and pure white peristome and teeth. In the example before me the umbilicus is not completely covered. Type in my own collection. This form should not be confused with Pilsbry's var. *guadeloupensis*. The latter is chestnut-colored and carinated at the periphery.

Maxwell Smith.

The Nautilus.

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AN INCIDENT IN CUBAN COLLECTING.

BY JOHN B. HENDERSON, JR.

In the course of a number of collecting trips to the Antilles for land shells I recall various instances of possibly more than average interest to those who know the delights of a field naturalist. Whenever some particular out-of-the-way locality was visited, often there would be some one species sought and desired above all others, generally a species of very local distribution, and which on account of rarity or beauty inspired us to greater efforts to find. So was it in the case of that splendid big and lusty *Pleurodonte gigantea* at La Ferrière in Haiti, and of *Pl. cognata* in a little valley in extreme western Jamaica. Cuba is full of such preferred and desirable game, but probably the special hunt for *Urocoptis elliotti* and its near ally, *U. dautzenbergiana*, proved to be the most strenuous of all similar experiences.

Mr. Charles T. Simpson was with me at the time in Havana, and we were planning for a dash somewhere into the interior when our excellent friend, Dr. Carlos de la Torre, a perfect encyclopedia of Cuban mollusks, suggested we try for that remarkable pair of Urocoptid twins that are reported to live on two mountains near Guane, and which had eluded all search since they were originally found by some fortunate collector many years ago. We lost no time in getting to Guane. Besides our special reason for going there, we well knew the region to be rich in that splendid fauna of the inner range of the Sierra de los Organos. There occur the lovely *Eutrochatella*

regina, the *parraiana* group of Helices, a host of Urocoptids, fine operculates and some peculiarly painted *Liguus*. Doctor Torre couldn't resist the temptation at the last second, so boarded the train with us. The doctor is always a most welcome and charming companion.

We located our mountains, which are in sight from Guane. One of them is the "Sierra de Guane," and somewhere upon its steep and precipitous sides we must look for *elliotti;* the other is called "Sierra de Paso Real de Guane," where presumably lived in security from prowling naturalists the strange *dautzenbergiana*.

Now we simply had to have those fellows. We prepared for their capture with the care and thought that mountain climbers give to their campaigns against loftier peaks. On horseback and by volanta we proceeded to the base of the Sierra and began our recognizance, but without a sign, not a "bone," of *elliotti*. There were, however, no end of other things, and the day was made glorious by a catch of great size and interest. It is a day that fairly shines in memory, and I have lived it over in retrospect with Simpson many times since.

The next morning bright and early we made our second attack. It was apparent that some climbing must be done. Far up on one side a great white limestone escarpment projects out from the mass of tropical vegetation covering the mountain, like the forehead of some great giant of the Sierra. It is perpendicular, forbidding and dangerous. Buzzards constantly circle about it, and it is likely to be the nesting-place of millions of fretful wasps; but just in such places live some of Cuba's very best molluscan offerings. I felt it must be attained, so up I "goes," scrambling, slipping, clinging to trees, crawling along limbs, only stopping now and then to catch a breath or to pick some appealing Liguus. Up until the blue Caribbean glistened on the horizon and the plains of Pinar del Rio lay stretched out like some huge map. At last the base of the cliff was attained, but no *elliotti* as yet. Through narrow crevasses I wriggled on up until finally, quite done for and exhausted, I lay for a while upon a little projecting rock-shelf to cool off and to speculate upon the folly of ever leaving a happy home, etc. Then, not suddenly, but gradually, I began to take in a remarkable sight. It required some moments to acquire what the psychologists call the "presentation" of the sight, but soon my heart began to thump and

my excitement to grow until I almost feared to trust myself alone upon such a height. All over the rocks, on the perpendicular cliffs, and exposed to the glare of a dazzling sun, were myriads of *U. elliotti*, clinging in their peculiar fashion to the surface, all alive and in finest condition of unbroken spires, and that color tone of health possessed only by fresh, living shells.

But now arose the problem as to how to gather them. It takes one hand to hold a box, another to pick specimens from their moorings, and it requires two more to hang on to the wall of smooth rock. Fortunately there was a breast pocket in my shirt, and with a twig I could keep it gaping open. Then with my lips I tenderly gathered them one by one, slowly and cautiously, and spat them into that happy pocket.

Had any telescope been trained upon me I would only have furnished one further evidence of hopeless mental condition, for indeed what sane man would spend an hour, or a moment as for that, fondly kissing a lofty cliff in Pinar del Rio?

If any reader of the NAUTILUS cares to take a chance on that telescope down below, and also the risk of a long fall, I can assure him that there are still a hundred thousand fine *U. elliotti* waiting for him right there on the Sierre de Guane.

REMARKS ON UNIO VARICOSUS, CICATRICOSUS AND UNIO COMPERTUS, NEW SPECIES.

BY L. S. FRIERSON.

A study of the shells generally known as either *Unio cicatricosus* Say or as *varicosus* Lea has brought to light a singular state of affairs. The *U. cicatricosus* was described by Say in manuscript, "together with about twenty others," in 1826, and published with such others as he supposed had not yet been described by other authors, in 1829. Taking, with his very incomplete description, the illuminating remarks following, we find that Say's species was a large, thick shell, with high beaks, but not so high as in the allied *Unio cordatus* (*obliquus* Lam.), and having a single row of transverse elevations down the center of the disc, and that it is "*a common inhabitant of the Wabash river.*" This is applicable to no known Unio except the *aesopus* of Green. This conclusion is fortified by the fact that

Conrad, who shortly after this time had become quite intimate with Say, so considered it in his "New Fresh-water Shells," published in 1834. So did Dr. Lea, but the opinion of the latter was discounted by conchologists because of the well-known enmity which unfortunately had sprung up between Say and Lea. Say himself placed Lea's *Unio varicosus* as a synonym of his *Unio cicatricosus*, in the short and exceedingly erroneous Synopsis of 1834. This dictum of Say has been accepted by nearly all conchologists since, but Say had never seen Lea's species, and his idea no doubt arose from Lea having *compared his varicosus with the aesopus* of Green. Say having shortly afterwards died, this dictum was never corrected by him.

It is true that Green had in 1827 published his *Unio aesopus;* but Say tells us that he had to forego at this time (1829) a design of compiling a synopsis of the western Uniones, *because of the impossibility of procuring books, etc.*, in his insulated abode, and Dr. Green's article, which was published in a rather obscure publication, no doubt had escaped his notice. At any rate the assignment of the Wabash as a common habitat of the *cicatricosus* effectually bars his shell from being the same as Lea's species, as the *varicosus* does not live in that river. Say's name then, being a synonym of *aesopus*, cannot be used for Lea's shell. Lea's name, as he tells us himself, had already been used by Lamarck; consequently his shell has no name.

Turning now to the shells themselves, we find equally as much confusion. There are no less than *four distinct species* so called to be found in our various museums and collections. Lea himself did not know his own shell very well, since, I am told by Dr. Dall, specimens of genuine *varicosus* were labeled by him as *subrotundus*, while on the other hand we are informed by Dr. A. E. Ortmann that a shell labeled *cicatricosus*, from the Beaver river, Pa., in the Academy of Natural Sciences, is in reality only an old *Unio subrotundus*. In the Conchologia Iconica of Reeve we are given two plates of this species (figs. 31 and 50) which evidently represent two different shells. Plates and names, therefore, will be given that students may recognize the sundry shells which at present go under the common names under discussion.

Unio detectus, new name. Plate II, lower, pl. III, upper figures.

This is the true *varicosus* of Lea, whose type shell is not *typical*

of the species (i. e., is not an average specimen). The best figure of this shell, though itself poor, is that given by Küster (Taf. 58, fig. 2). In its general facies the shell somewhat resembles the *Unio pyramidatus*, with the addition of the characteristic elevations. Mr. Swainson mentioned that he had seen a specimen of *mytiloides* with pustules down the center. There can be no doubt that he had a shell of this species before him. The specimen figured was given me by Dr. Dall, and came from the collection of the National Museum. It measures, length 87, alt. 70, diam. 39½ mm.

Unio cicatricoides, new name. Pl. II, upper figure.

This is the shell figured and described by Conrad in his Monography (page 115, plate 64), and also by R. E. Call, Indiana Mollusca (Indiana Geological Report, 1900), plate 55, to which description and plate reference is herewith made. Its general facies is much more like *aesopus* than *detectus*, from which latter it differs in being more inflated (especially behind) and is a larger shell; its lateral teeth are much more club-shaped and larger; the posterior sinus of the hinge margin is nearer the end of the ligament; the color of the epidermis is also different from that of *detectus*. Length 93, alt. 69, diam. 55½ mm.

Unio compertus, new species. Pl. III, middle and lower figs.

Shell medium in size; length 2.3, height 2.1, diameter 1.3 inches. Apparently dimorphic, the females (?) being broader behind than the males and more rounded, the males (?) being somewhat triangular and pointed behind, beaks high and well forward (their sculpture not seen). Epidermis dirty yellow, darker before (as in *circulus*). Basal outline rounded, and in the females expanded in the middle; shell not very much inflated. The posterior ridge is rounded, and becomes more and more inflated with age. The posterior area is narrow, with several more or less well-defined lines from beak to margin. Down the center of the disc runs a row of pustules, larger in the females, as well as more numerous. Inside, the nacre is white, quite thick in front, as far back as the center, or row of pustules, from thence it becomes remarkably thin in comparison, producing a trough-like excavation from beak to posterior base. Teeth erect and fairly stout; two cardinals and two laterals in the left valve and one each in the right.

Habitat: Clinch and Holston rivers.

The examples figured had been labeled *Unio cicatricosus* by Dr. James Lewis, and his determination had been O. K.'d by Mr. C. T. Simpson. Shells the same as these have been loaned the writer by Mr. W. A. Marsh under the same name (i. e., *varicosus*). Others of the same species had been given the writer by Mr. Bryant Walker as being the *varicosus* of Lea. With their attention called more carefully to the shell, however, both of these gentlemen now concur with me as to their novelty. Type in my collection. This shell is remotely, if at all, related to the other shells above mentioned. There is apparently a slight relationship to *Unio propinquus* in its general facies, but the species is in reality very distinct.

NOTE.—The term *Unio* is used above in the old broad sense of denoting a naiad shell having both lateral and cardinal teeth, and not in the restricted sense now held by our modern conchologists, and so embraces the various divisions of Quadrula, Pleurobema, Plethobasis, etc., etc., as the future study of the soft parts may incline the future systematists to place them.

CORRESPONDENCE FROM BRAZIL.

BY FRED. BAKER.

S. S. RHAETIA, HAMBURG-AMERICA LINE,
ON THE RIO NEGRO, 950 MILES FROM THE MOUTH
OF THE AMAZON, *July* 24, 1911.

Dear Dr. Pilsbry:

This goes in compliance with my promise to report of our progress. We left Natal, in the State of Rio Grande do Norte, on July 1st for Pará, after a stay that was comparatively barren of results zoologically. The reptilian collection is good, but in all other lines the number of species is small. My collection of marine shells—notwithstanding several days spent in dredging—is small enough, so that I feel sure that they are not to be found on this immediate coast, for reasons that we can only guess at at present. By interesting the ubiquitous small boy in a couple of interior towns I was able to secure several thousand land and fresh-water shells of a rather limited number of species. I feel reasonably sure that I have two new species

1. UNIO CICATRICOIDES FRIERSON.
2. UNIO DETECTUS FRIERSON.

1. UNIO DETECTUS FRIERSON.
2, 3, 4. UNIO COMPERTUS FRIERSON.

of *Tomigerus*, but the other things, unless it be in *Pisidium* and *Planorbis*, seem likely to prove well known.

On the way up the coast to Pará two of us decided that it would be a shame to visit Brazil and not go up the Amazon, so after seeing the rest of the party off for New York we got aboard this ship for a run at least as far up as Manaos, on the Rio Negro, 1004 miles from the Amazonian mouths. Our experience would be a surprise to Bates and Wallace, or even to Agassiz. Manaos is the real center of the great trade in so-called Para rubber, and in these later days great ships clear direct for this port from New York and various European countries. So we were able to take passage for a thousand miles in this transatlantic liner of 6600 tons, furnishing magnificent accommodations and service, and we are just finishing the run against the powerful current of the rivers in less than three and a half days. We shall get in this evening, but shall not be allowed to land till the morning.

Our further plans are a trifle in the air, but we are going to try for passes up the Madeira river for some six hundred miles to the works of the Madeira & Mamoré R. R. Co. Here the government is building some two hundred miles of railroad at enormous expense around the falls and rapids of the Madeira river to tap another thousand miles of navigable river running into the heart of the rubber country forming the angle of Bolivia and Peru. The enterprise is largely in the hands of American and English engineers and physicians, and we are assured of a warm welcome and much help in collecting if the powers that be decide to send us up.

I believe that no land or fresh-water shells have gone out from this Madeira country, so that I feel sure of getting material of much value if I get any. Likewise my companion, the entomologist, knows of nothing in his line that the country has furnished except some butterfiies, so we are both extremely anxious to get in. If we succeed we shall have at least a month on the ground for actual collecting.

Meanwhile we have had a most glorious sail up the Amazon till a couple of hours ago, when we entered the Rio Negro. To avoid the heavy current the ship has hugged the sides of the river, often within a hundred feet, giving us a splendid chance to observe animal and vegetable life at a reasonable range for field-glasses. Animal life has not been plentiful, but it has been interesting. The harpy eagle, parrots, toucans, kingfishers, terns and three species of heron have

been the most striking birds, with many that we could not place at all. An occasional alligator or crocodile can be seen, but we are surprised at the scarcity of this beast. During every minute of daylight there has been something beautiful and interesting to look at, and the cool nights are as delightful as the days, which are not excessively warm. We are impressed with the fact that few people realize that the round trip can be made from New York to Manaos for $160, with stops of several days at Pará and Manaos, in really fine vessels. Otherwise it seems probable that many people would take the run. The ship's surgeon is a noted German professor, who takes this method of getting a splendid vacation.

P. S. Manaos, July 25, 1911. Have just landed and got settled. We learn that we shall be delayed a week waiting the return of the Madeira & Mamoré Co.'s steamer and manager, but we are assured that we shall be sent up to the Madeira river, as we had hoped, free of cost for the trip and living expenses while there. Also we are told that there are land shells about Manaos, so the time will not hang heavily on our hands.

A NEW VARIETAL FORM OF SCALA PRETIOSA LINN.

BY MAXWELL SMITH.

SCALA PRETIOSA (Linn.), n. var. MULTIVARICIFERA.

This form differs from the type in the broader shell and greater number of varices. Comparing an average shell with the variety, the number of varices is as follows:

Typical form.	*Var. multivaricifera.*
Embryonic whorl,	Embryonic whorl,
Embryonic whorl (?),	Embryonic whorl (?),
Third whorl, 8 varices,	Third whorl, 8 varices,
Fourth whorl, 8 varices,	Fourth whorl, 8 varices,
Fifth whorl, 8 varices,	Fifth whorl, 8 varices,
Sixth whorl, 8 varices,	Sixth whorl, 9 varices,
Seventh whorl, 8 varices,	Seventh whorl, 11 varices,
Body whorl, 10 varices.	Body whorl, 15 varices.

Around a portion of the body and upper whorl of the variety

before me there is an impressed longitudinal line which interrupts 12 of the varices. When older the animal corrected this irregularity. This line will probably be found absent in other individuals.

It seems remarkable that so striking a shell as this form has heretofore escaped notice. The habitat of the type, which is in the writer's collection, is supposedly China.

NOTE ON THE DISTRIBUTION OF MARGARITANA MONODONTA SAY.

BY BRYANT WALKER.

In commenting, recentiy, on the distribution of this species (Proc. Mal. Soc., IX, pp. 137–139, 1910), I stated that although it had not been cited from the Ohio east of Cincinnati nor from the tributaries of the Tennessee above Knoxville, in the absence of any records of its occurrence west of the Mississippi, south of Iowa, nor in that river below Adams County, Ills., "the inference would be that its original point of dispersal was in the east, and that it had migrated westward by two routes, one down the Ohio and thence into the Mississippi Valley, and the other down the Tennessee from its tributaries or head-waters. That it reached its present range by a migration from the southwest is, in view of the known facts of its present distribution, quite improbable."

Since the above was written some additional data of considerable interest have been received.

In the fall of 1910, acting under the instructions of the U. S. Fish Commission, Mr. A. H. Boepple explored the Cumberland River from Pineville, Ky., to Celina, Tenn. In his progress down the river he found *M. monodonta* at the Sloan Shoals near Burnside, between Eads' Landing and Rowena, and at Cloyd's Landing.

I have also recently received the species from three localities in the Clinch River, Tenn., viz., near Needham's Ford and between Kelly and Sharp's Ford, Union County, and between Agee and Offut, Anderson County.

These records definitely determine the occurrence of the species in all of the principal rivers that unite to form the Tennessee, excepting the Powell and the French Broad, and its presence in the Clinch makes it reasonably certain that it will also be found in the former. The head-waters of the latter rise in another, quite differ-

ent region, and it may not be found in it at all, except, perhaps, near its junction with the Holston.

The presence of the species in the Cumberland offers a possible explanation for its occurrence in the Ohio below Cincinnati and in the Wabash. But that, of course, can not be definitely determined until all of the southern tributaries of the Ohio, which head in the mountains of West Virginia, have been carefully explored. If the species should be found in the Big Sandy or the Great Kanawha, for instance, it would seem likely that it reached the Ohio from that source, even though, at the present time, it is not found in that river above Cincinnati.

But, however that may be, these new records tend to confirm the opinion that the original point of dispersal of the species was in the head-waters of the Tennessee system and that its present distribution is "rather the result of an ancient migration from the northeast than one from the southwest."

LAND MOLLUSCA AT TOLLAND, COLORADO.

BY T. D. A. COCKERELL.

On August 23 and 24 my wife and I collected snails at Tolland, in Gilpin county, Colorado, at an altitude of 8900 to 9000 feet. The list of species, though short, may be of interest on account of the high altitude, and the addition of one species to the Colorado list.

Agriolimax campestris montanus (Ingersoll). Variable, some very dark.

Vitrina alaskana Dall. Abundant.

Euconulus fulvus alaskensis Pilsbry, abundant.

Vitrea radiatula electrina var. *alba* (Jeffreys) Taylor. One.

Zonitoides arboreus (Say). Common under *Populus tremuloides*.

Punctum pygmæum minutissimum (Lea). My wife found two by carefully searching over dead leaves from the *Populus tremuloides* zone. I believe only one specimen of this species has previously been found in Colorado. Taylor (Monog. L. & F. W. Moll. Brit Is.) cites Willow Creek and Cloudcroft, but the latter locality is in New Mexico.

Sphyradium edentulum alticola (Ingersoll) The adult is over

2½ mm. long, and is to be compared with the European variety *columella* (Von Mart.) or *gredleri* (Clessin).

Vallonia cyclophorella Ancey. Abundant.

Pyramidula cronkhitei anthonyi Pilsbry. Not uncommon.

Cochlicopa lubrica (Müller). One.

Pupilla muscorum (L.). Several of the typical edentate form.

Pupilla blandi Morse. Common.

Pupilla syngenes dextroversa P. & V. New to Colorado. One shell, 4 mm. long, nearly 2 broad; whorls 7½, the upper ones not swollen as in typical *P. syngenes*.

Vertigo modesta parietalis (Ancey). Common. Rather small for *parietalis*, but over 2 mm. long; palatal plicæ long, as in *concinnula;* shell clear chestnut; aperture strongly elbowed above. This is apparently a distinct race, between *parietalis* and *concinnula*, but hardly recognizable by a separate name. Ancey's name, *ingersolli*, certainly included such forms as this, and could be so restricted without much risk of error.

NOTES.

Note on Epiphragmophora infumata Gld.—In Mr. Edson's interesting paper on the Land Mollusca of San Mateo Point, California (on the western shore of San Francisco Bay), in the June Nautilus (Vol. xxv, p. 17), occurs a statement as to the habitat of *E. infumata* Gld. which needs correction. While he states the southern limit of this form as Santa Rosa, which is about 50 miles north of San Francisco, I have collected it for many years on the eastern side of San Francisco Bay, in Alameda county. In his Manual of American Land Shells (U. S. Nat. Mus. Bull., No. 28), Mr. Binney also mentions the Bay region and Alameda county as its home as far back as the year 1885. The shells found here are the extreme form of this species (or var. of *E. fidelis?*), being black, highly carinate, heavily hirsute, and bearing the scales mentioned by Dr. Gould in his description well marked, as distinguished from the specimens from Marin county and further north.

As to the typical *E. fidelis*, collected at San Mateo Point by Mr. Gifford, it seems clear that they were chance specimens or exotic. I might hazard an opinion that this form became introduced through the oyster traffic in which, years ago, the native Washington bivalve

was brought to our Bay in large quantities, or it may have been planted there.—Fred L. Button, Oakland, Cal., July 20, 1911.

Epiphragmophora fidelis.—I note in the Nautilus for June, 1911, that Mr. Harry Edson regards my record of *Epiphragmophora fidelis* from San Mateo Point, California, as erroneous. I would state that the specimens were *E. fidelis* without the slightest doubt Furthermore, I again collected living specimens in the same locality on August 14, 1910.—E. W. Gifford.

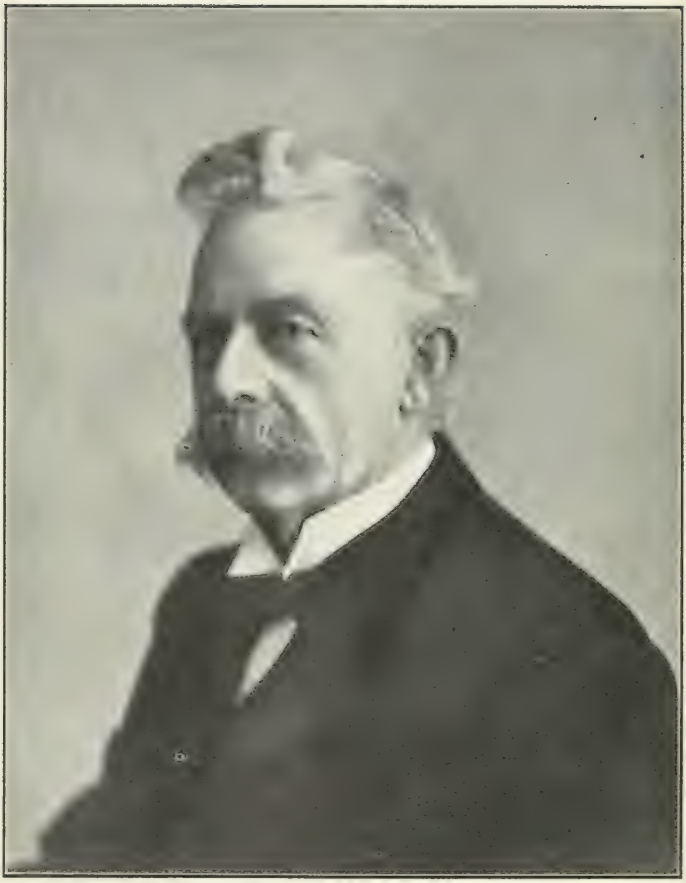
Lymnæa auricularia Linné in Canada.—On July 23, 1911, I found *Lymnæa auricularia* Linné inhabiting a chain of pools on the beach of Lake Erie at Kingsville, Ontario, about opposite Sandusky. Young individuals were fairly numerous, but the only mature shell seen was a dead one.—John A. Allen.

Locality for Polygyra (Triodopsis) obstricta Say.—Beyond Murphreesboro (Tennessee) there is a road turning square to the right from the main pike. About half or three-quarters of a mile out, on the right-hand side of the road, is the only good locality I ever found for *obstricta*. There they were typical, large, fine shells. They were found about dead logs and old stumps.—A. G. Wetherby, in letter, about 1898.

Limax maximus on Nantucket Island.—When recently at the town of Nantucket, Mass., I found *Limax maximus* well established. There were two varietal forms: (1) Mantle spotted, the spots partly confluent; body marbled and with four gray-brown bands, the two inner with blackish spots. (2) Mantle marbled; body gray with three light bands, the inner rather dark edged. I also found *Agriolimax agrestis* at Nantucket; likewise on Cuttyhunk, where it was the only terrestrial species I could find.

I take this opportunity to note that *Helix hortensis* var. *bicolor* Ckll., 1891 (shell pink with upper part of spire yellow), is preoccupied by var. *bicolor* Picard, 1840. My variety may be named *dichroa*.—T. D. A. Cockerell.

Dr. Arnold Ortmann has recently returned from a successful campaign for *Unionidæ* in West Virginia.



PROFESSOR JOSIAH KEEP

The Nautilus.

Vol. XXV. OCTOBER, 1911. No. 6

PROFESSOR JOSIAH KEEP.[1]

BY WM. H. DALL.

Professor Keep, whose death, July 27th last, at Pacific Grove, California, was recently announced, was born in Paxton, Mass., in 1849, and was a graduate of Leicester Academy and Amherst College (1874), taking his Master's degree as a postgraduate student in 1877. In that year he married Amelia Caroline Holman, of Leicester, Mass., and went to California. There he taught in the Golden Gate Academy and the Alameda High School, being principal of the latter from 1881 to 1885. In 1885 he became Professor of the Natural Sciences in Mills College, which, from small beginnings as a private seminary for girls, has through the efforts and generosity of its founders developed into a well-equipped and charmingly situated college, the Wellesley of the Pacific Coast.

Here Professor Keep found his life-work as teacher and coadjutor with the still surviving founder, Mrs. Mills, and saw the branches of science originally confided to him alone, by degrees represented in the teaching force by a number of competent instructors, while he retained for himself the subjects of geology and astronomy.

With the wide general knowledge required by his field of work, it was of course impossible for him to be a specialist in any, but his deep interest had been aroused in the study of the mollusca in which the Pacific Coast is so rich. Between 1881 and 1911 he published a series of what might be called primers of west-coast shells, illustrated with figures, enabling the beginner to gain a preliminary

[1] From *Science*, October, 1911.

knowledge of the attractive shells of California. To these little books we may fairly ascribe much of the wide-spread interest which is to-day found among Californians and which by the coöperation of amateurs with specialists, has immensely increased our knowledge of the Pacific Coast fauna.

The last of these manuals was published only shortly before his death. Professor Keep was one of the founders of the Chautauqua Assembly which meets at Pacific Grove, and frequently lectured to its classes on his favorite subject. He was also one of the most earnest supporters of the Museum and Library at Pacific Grove.

Modest, courteous, indefatigable and enthusiastic, he was primarily a teacher and organizer; beloved by his classes and appreciated by those reached through his books and so led to the study of nature. In his unassuming way he has done a good work and found his reward in doing it. He leaves a widow, son and daughter to mourn his loss.

ADDITIONAL NOTES ON THE LOCOMOTIVE DISK OF STYLOMMATOPHORA.

BY V. STERKI.[1]

During the last years some additional observations on this subject were made. Nearly all of the species mentioned in the former article have been seen again and the data were verified, and some others were examined. To repeat, there are marked differences in this respect, between species, genera and groups apparently or really closely related, especially among the *Zonitidæ*, and these features have probably much significance in classification, in connection with the formation of the lateral (marginal) longitudinal groove or grooves, on the upper surface of the foot (pedal grooves), and possibly the presence or absence of the caudal mucus gland, as pointed out, *e. g.*, by Dr. Pilsbry.[2] More observations and morphological and anatomical examination are needed on the subject.

Zonitidæ.

Omphalina fuliginosa (Griff.). The median zone was seen (or

[1] See article in THE NAUTILUS, XXII, p. 49, 1908.

[2] In the generic position of *Patulastra* * * * with suggestions of a classification of the American *Zonitidæ*, THE NAUTILUS, IX, p. 19.

appeared) to extend to the very posterior end of the sole, and each wave starts there.

O. inornata (Say). Foot very long and slender; zones rather distinct, narrow, but widening to nearly the whole width of the sole at the anterior end. Apparently there is an additional marginal zone along each margin, quite narrow and whitish. Waves distinct in the median zone, about 10 simultaneously.

O. lævigata perlævis (Pils.) (from Ky.). Three zones slightly marked, not in color, which is grayish with a slight olive tinge. Waves plainly visible, about 8.

Vitrea [= *Hyalina*] *wheatleyi* (Bld.). Sole very narrow; zones rather distinct, even with slight furrows marking them when the sole is detached; the median about the width of the marginals, in the middle, wider near the anterior end. Waves distinct in the anterior two-thirds (as in *radiatula*).

V. draparnaldi (Beck). Sole narrow; three zones distinct, the median slightly wider than the marginals, very narrow posteriorly, and not reaching the posterior end. Here also, when the sole is detached from the substratum, there are two rather deep sulci between the zones. Waves distinct, 8–10, in rapid succession; anterior end of the foot progressing with a slight jerk as each wave reaches it. Margin of the foot above marked off by two longitudinal furrows (on each side).

Gastrodonta intertexta (Binn.). No zones marked, not a trace of waves, just as in *G. ligera*. The margin of the foot above, outside of the longitudinal furrow, is rather broad and of a more yellowish tinge than the balance of the dorsum.

G. suppressa var.?[1] No zones, and no waves seen, even in direct sunlight, transmitted.

Euconulus chersinus (Say). No waves seen; no zones on the surface; zones slightly marked internally in transmitted light (as it would be in all snails).

Limacidæ.

Limax maximus L. Sole with three zones rather sharply defined, the median rather narrower than the marginals. Waves very distinct, about 20 in large specimens, from very near the tail end, each

[1] Rather large, with higher spire; a heavy deposit (callus) in the last whorl near the aperture, but no lamellæ; may be distinct.

wave (= muscle contraction) much shorter than the interval (in space).

Agriolimax agrestis (L.).[1] Three zones distinct, the median, rather narrow, does not reach the anterior end, so the marginal is continuous all around. Waves distinct, about 16 (in specimens 35 mm. long) in rapid succession.

Arionidæ.

Arion rubellus St.[2] A slightly and not sharply marked median zone, wider towards the anterior end, somewhat hyaline, that is: with few or none of the yellowish opaque (glandular?) granules disseminated in the rest of the sole. Waves visible, but not distinctly, more remote from the surface of the sole than in *Polygyra* and *Limax*, and more remote from each other than in *Agriolimax agrestis*, and proceeding slower.

Philonaycidæ.

Philomycus dorsalis (Binn.). No well marked zones, and no waves seen.

Helicidæ—Polygyrinæ.

Some additional *Polygyræ* examined show essentially the same features as those noted before; all with distinct zones and waves.

P. albolabris (Say). Foot and sole light-colored, not drab, and color in the three zones little different; waves about 12.

P. multilineata (Say). Sole drab-colored; waves 9–10.

P. appressa (Say). Sole long and narrow; waves 10–11, comparatively numerous for the size of the snail.

P. stenotrema (Fér.). Waves about 7.

P. hirsuta (Say). Median zone grayish, marginal dull, pale reddish to purplish, with strongly marked transverse lines. Waves about 7.

Pupidæ.

Bifidaria pentodon (Say). Foot very short; zones not evident on the sole; waves distinct, about 3, extending over nearly the whole width of the sole.

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[1] From one place (in Lake Co., Ohio) several dozen were collected, showing extremes of color: from whitish without any dark mottlings to almost entirely black; some of a tan to brownish tint.

[2] From a nursery in Lake Co., Ohio. Appears to be distinct from *hortensis;* described about 1682; European.

THE NOMENCLATURE OF HARPA.

BY CHARLES HEDLEY.

Australian Museum, Sydney, N. S. Wales.

Application of the law of priority to the genus *Harpa* is attended with the usual wreckage of familiar names. Not having observed any recent adjustment of this nomenclature, I offer the following notes:

The generic name of *Harpa*, as Dr. W. H. Dall has pointed out (Journ. of Conch., XI, 1906, p. 296), should be ascribed to Bolten (Mus. Bolt. [2], 1798, p. 149), not as in Fisher's Manual, to Rumphius, who was prenomial, or to Lamarck, who was a year later.

According to Hanley's examination of Linnean types (Ipsa Linn. Conch., 1855, p. 251), *Harpa nobilis* Lamarck, usurps the place of *Buccinum harpa* Linn., which should become *Harpa harpa* Linn. Yet most writers followed Lamarck in reducing *Buccinum harpa* to the synonymy of *Harpa ventricosa* Lamarck.

Hanley continues to show that by *Buccinum costatum* Linn. is meant *Harpa imperialis* Lamarck. Deshayes (An. s. vert., X, 1844, p. 129, footnote) had already censured Lamarck for his superfluous name, and recommended the restoration of *Harpa costata* Linn.

Bolten was the first to separate binomially the species that Linné had confused. For one of these, illustrated by Martini, figure 1090, he proposed (*op. cit.*, p. 149) the name *Harpa major*. Lamarck later included the same figure of Martini in the synonymy of the species he proposed to call *Harpa ventricosa*.

Similarly for the species illustrated in the Conchylien Cabinet by fig. 1092, Bolten proposed *Harpa davidis*, and for the same Lamarck subsequently introduced *Harpa articularis*.

Again, to the shell shown by Martini in fig. 1094, Bolten gave the name of *Harpa doris*, for which Lamarck afterwards substituted *Harpa rosea*.

Finally, Bolten gave the name of *Harpa amouretta* to a species illustrated by his predecessors, figure 1097. This later served to express the *Harpa minor* of Lamarck.

Suter (Deutsch. Malak. Ges. Jahrbuch, IV, 1877, p. 129), divided the genus into sixteen recent species. These Tryon re-

duced to nine (Man. Conch., V, 1883, p. 97). Adding a distinct Australian species to the latter estimate, the genus will stand thus (synonyms in italics).

HARPA Bolten, 1798 = *Harpa* Lamarck, 1799.
H. harpa Linné, 1758 = *H. nobilis* Lam., 1822.
H. costata Linné, 1758 = *H. imperialis* Lam., 1822.
H. major Bolten, 1798 = *H. ventricosa* Lam., 1822.
H. davidis Bolten, 1798 = *H. articularis* Lam., 1822. / *H. conoidalis* Lam., 1822.
H. doris Bolten, 1788 = *H. rosea* Lam., 1822.
H. amouretta Bolten, 1798 = *H. minor* Lam., 1822.
H. cancellata Bolten, 1798 = *H. striata* Lam., 1822.
H. crenata Swainson, 1822.
H. gracilis Broderip. and Sowerby, 1829.
H. punctata Verco, 1896.

MOLLUSKS OF WELLESLEY ISLAND AND VICINITY, ST. LAWRENCE RIVER.

BY FRANK C. BAKER.

Several years ago the writer spent two weeks at Thousand Island Park, and a collection of the mollusks of the nearby region was made. Local lists from this part of New York State are lacking, and the following catalogue may be of interest for this reason. The localities where collections were made are as follows, all being in Jefferson County, N. Y.:

1. Goose Island, near Wellesley Island.
2. South Bay, Wellesley Island.
3. Blind Bay, New York shore.
4. Watson's Point, Wellesley Island.
5. Thousand Island Park, Wellesley Island.
6. Lake Waterloo, Wellesley Island.

The Thousand Islands lie in the head of the St. Lawrence at the outlet of Lake Ontario. Wellesley Island is one of the large islands. It is high and rocky, the rocks being granitic. It is well wooded over a rolling surface, with here and there a pond or swamp.

Pelecypoda.

Lampsilis ventricosa (Barnes), Station 2, rare.
Lampsilis radiata (Dillwyn). Stations 1, 2, common.
Anodonta marginota (Say). Station 2, common.
Unio nasutus (Say). Stations 1, 2, common.
Unio complanatus (Solander). Stations 1, 2, common.

Gastropoda.

Campeloma decisum (Say). Station 6, rare.
Campeloma integrum obesum (Lewis). Stations 2, 3, rare.
Valvata lewisii (Currier). Station 2, rare.
Bythinia tentaculata (Linn.), Station 5, common.
Goniobasis livescens (Menke). Stations 2, 6, common.
Physa gyrina (Say). Station 5, common.
Planorbis trivolvis (Say). Stations 2, 4, 6, common.
Planorbis binneyi (Tryon). Station 2, common.
Planorbis bicarinatus (Say). Station 2, common.
Planorbis campanulatus (Say). Stations 2, 4, 6, common.
Planorbis parvus (Say). Station 5, rare.
Planorbis hirsutus (Gould). Station 5, common.
Segmentina armigera (Say). Stations 2, 6, common.
Lymnæa stagnalis appressa (Say). Stations 2, 3, common.
Galba palustris (Müller). Stations 2, 5, 6, common.
Strobilops labyrinthica (Say). Station 4, not common.
Bifidaria contracta (Say). Station 5, common.
Succinea ovalis (Say). Station 5, common.
Succinea retusa (Lea). Stations 4, 5, common.
Polygyra tridentata (Say). Station 5, common.
Polygyra albolabris (Say). Station 5, common.
Polygyra fraterna (Say). Stations 4, 5, common.
Circinaria concava (Say). Station 4, not common.
Vitrea hammonis (Ström). Stations 4, 5, common.
Vitrea indentata (Say). Station 5, common.
Euconulus fulvus (Müll). Station 4, rare.
Zonitoides arboreus (Say). Stations 4, 5, common.
Agriolimax campestris (Binney). Station 5, common.
Philomycus carolinensis (Bosc.). Station 5, rare.
Pyramidula alternata (Say). Stations 4, 5, common.
Helicodiscus parallelus (Say). Station 4, common.

EPIPHRAGMOPHORA CALIFORNIENSIS, AND THE SHELLS COMMONLY CALLED VARIETIES THEREOF.

BY HENRY M. EDSON.

My attention was first attracted to the complexity of the nomenclature of this group two years ago, while trying to identify a shell which afterwards proved to be a deformed *Epip. nickliniana* Lea. Since then I have made a very careful study of the group, and have collected over the entire distribution area, and particularly at the type localities.

Dr. H. A. Pilsbry's[1] catalogue of American land shells was the last work of any scientific value dealing with these species, so I have taken that as a base from which to work, and will discuss separately each of the varieties he retained, and afterwards give my conclusions. The following shells were retained in his list:

Epip. californiensis Lea.
Epip. californiensis, var. *nickliniana* Lea.
Epip. californiensis, var. *anachoreta* W. G. B.
Epip. californiensis, var. *ramentosa* Gld.
Epip. californiensis, var. *bridgesi* Newc.
Epip. californiensis, var. *diabloensis* J. G. C.

Epiphragmophora californiensis Lea.

This is a species of the maritime region of the Upper Sonoran faunal belt, of very limited distribution. It is found most abundantly at Point Pinos, Monterey Co., collected sparingly at Point Cypress and Point Lobos, and at a few intermediate localities covering a distance of about twenty miles. It is usually found in the loose sand at the base of plants and small shrubs; I have counted as many as one hundred collected around the roots of a purple sea aster. The young shells are conical with closed umbilicus.

Epip. californiensis, var. nickliniana Lea.

This is a subspecies of the wooded zone of the Upper Sonoran belt, but overlaps into the Humid Transitional. It shows great variation, which fact was early recognized by Dr. Newcomb.[2] It is widely

[1] Nautilus, xi, 1897.

[2] Amer. Jour. Conch., I, p. 342, 1865.

distributed, extending from north of Santa Rosa, south on both sides of San Francisco bay to Monterey on the coast, and San Benito Co. in the interior.

In a shell of so large a distribution it stands to reason that there will be variation, caused by lack of lime for shell-making in some cases, and in other cases to lack of moisture. It has been my experience that the shells collected in wet places were larger, with a more open umbilicus, than those from the more arid regions.

That *nickliniana* Lea is a variety of *californiensis* Lea I can find no proof. The young of *californiensis* are high-spired with closed umbilicus, the shells do not show the reticulated surface to any extent, and it is strictly a maritime species; while the young of *nickliniana* are planulate with an open umbilicus, the shells always show the reticulated surface, and it inhabits the moister spots in the wooded zone.

That *nickliniana* and *ramentosa* are identical no one can doubt who has studied and collected them. I have in my collection a set of twenty *nickliniana* from a small canyon in the foothills back of Palo Alto, from which it is possible to select as many different forms, running from a high spire with the lip almost entirely reflected over the umbilicus to low spire with a widely-open umbilicus. The reticulated surface and the purplish color of the nacre inside the aperture are present in all of the forms of *nickliniana*. In some localities the color band is obsolete.

E. nickliniana might be called the typical mollusk of the Upper Sonoran fauna belt in the central portion of the Coast Range system.

EPIP. CALIFORNIENSIS, var. ANACHORETA W. G. B.

This was a deformed *nickliniana*, and was so recognized by Mr. Binney[1] in later writings.

EPIP. CALIFORNIENSIS, var. RAMENTOSA Gld.

A small form of *nickliniana* from Bolinas, which does not differ from *nickliniana* except in size. I have a set from the same locality, which run from large to small, with both open and closed umbilicus.

EPIP. CALIFORNIENSIS, var. BRIDGESI Newc.

Described from a solitary dead shell from San Pablo, in which

[1] Bull. 28, U. S. N. M., p. 132, 1885.

Dr. Newcomb failed to recognize the connecting link between *ramentosa* and *nickliniana*. He says, "Its nearest approach to any described California species is to *H. ramentosa* Gld., which is much smaller in size, more solid in structure, with a more depressed spire, lighter color and more scaly granulations; from *H. nickliniana* Lea it is readily distinguished by its large umbilicus and difference in form."

Mr. Binney[2] placed it in the synonymy of *ramentosa*.

Epip. californiensis, var. diabloensis J. G. C.

This was another solitary dead shell, in the California State Collection, which was supposed[3] to have been collected in the Mount Diablo range by Prof. Brewer of the Geological Survey, who crossed the range near New Idria, in lat. 36° 30′, a distance of about two hundred miles south of Mount Diablo, which later writers have given as the type locality of *diabloensis*.

I fail to see anything in Cooper's description which in any way shows an affinity with this group, and suspect that the specimen was a form of *traski*. I have *traski* from Coalinga, which is about twenty miles south of New Idria, that fit the description very well. The shell figured by Binney,[4] Fig. 113, seems to me to be identical with the one figured as *bridgesi*, Fig. 109, and most certainly the shells from the vicinity of Mount Diablo are not the *diabloensis* of Cooper.

A list of the principal synonymy follows:

Epip. californiensis Lea.

Helix californiensis Lea, Obs., II, 99, 1839.
Helix vincta Val., Voy de la Venus, Moll. pl. I, fig. 2.

Epip. nickliniana Lea.

Helix nickliniana Lea, Obs., II, 100, 1839.
Helix californiensis Reeve, Con. Icon., no. 66.
Helix arboretorum Val., Voy de la Venus, pl. 1, fig. 3.

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[1] Proc. Cal. Acad. Sci., II, p. 91, 1861.

[2] Bull. 28, U. S. N. M., p. 133, 1885.

[3] J. G. Cooper, Proc. Cal. Acad. Sci., III, p. 260, 1866.

[4] Bull. 28, U. S. N. M., p. 134, 1885.

Helix nemorivaga Val., Voy de la Venus, pl. 1, fig. 1.
Helix ramentosa Gld., Proc. Bost. Soc. Nat. Hist., VI, 11, 1845.
Helix anachoreta W. G. B., Proc. Phil. Acad., 185, 1857.
Helix reticulata Pfr., Mal. Blatt., 87, 1857.
Helix bridgesii Newc., Proc. Cal. Acad., II, p. 91, 1866.
Arionta californiensis, var. *nickliniana* W. G. B., Bull. 28, 1885.

EXTRACTS FROM THE LOG OF THE EOLIS.

BY JOHN B. HENDERSON, JR.

The following extracts taken from the log-book of the *Eolis* are offered to the NAUTILUS readers at the editor's suggestion. The *Eolis* is a fifty-foot motor cruising yacht built by the writer especially for the purpose of dredging, and is provided with hoisting machinery, etc. At the time of these entries in the log the boat was cruising in south Florida waters, with Key West, and later, Tortugas, as headquarters. Mr. George H. Clapp, of Pittsburgh, was on board during both cruises. The passages from the log are taken quite at random:

"April 18, 1910" (in the Hawk Channel). ". . . coming in sight of Loue Key, a mere patch of coral sand on an exposed bit of the outer Florida Reef, we decide to try for some reef collecting, the tide being favorable. We run the *Eolis* almost to the key on the lee side, but with breakers all about us. The Captain, Clapp and I go ashore in the tender, leaving the *Eolis* rolling in uncomfortably shoal water. It is difficult here to record the first impressions of this our first experience on a tropical reef. At last the fine ones are to be had for the picking. In nervous haste we turn over the coral slabs and inspect their under sides. There they are, bright, shining, alive and beautiful: *Cypraea cinerea* and *spurca*, *Conus mus* and *floridana*, *Mitra barbaderis* and *nodulosa*, one excellent specimen of *Mitra fergusoni*, *Cassis*, *Pisania*, *Trivia*, *Oliva*, *Olivella*, and so on. The wash of the surf over the coral rocks where we are collecting, deprives us, I am sure, of many specimens, both by hiding them from sight and by washing them away. . . . Our catch, in two rather strenuous hours' work, is amazing in quantity and quality . . . arrive in Key West at 3 p. m."

"April 19, 1910" (Key West). "4 a. m.—Start for outer

channel buoy, cross the reef and put to sea for a few hauls on the edge of the Gulf Stream. Weather fine, sea smooth . . . 3d haul in 110 fathoms on a rocky rough bottom made even more difficult to negotiate by the strength of the current. We are now fairly on the 'Pourtales Plateau,' that narrow strip of sea-bottom which is pure gold in our imaginations. Possibly we expect too much from this happy hunting ground of Pourtales, for whatever may be its reputed treasures they are certainly well protected by the nature of their surroundings. This haul, made with great difficulty, brings up some fine brachiopods, some very beautiful Marginellas, and Eureka! *Voluta dohrni*. I am sure Clark will appreciate the wonderful yellow sea-urchins. . . ."

"April 22, 1910. . . . What a day this has been on Sand Key Reef. Were it not that the keen edge of our excitement has been dulled by a day on Loue Key Reef I am sure some of us would have become 'dippy.' As it is, our conduct to any chance observer might have raised suspicions. We danced and sang and called to each other in our eagerness to exhibit new things discovered. We must all drop everything and go over there to see the beautiful calico-patterned orange-colored mantle of *Ultimus gibbosus*, or all must hurry over here to see this octopus before he succeeds in wholly effacing himself. We fairly reveled in *Cypraea*, *Conus* (especially very fine *C. nebulosus*), *Mitra*, *Pisania*, *Pecten*, *Columbella*, *Marginella*, *Calliostoma*, *Turbo*, *Purpura*, *Latirus*, *Phos*, *Tritonidea*, *Lima*, *Avicula*, *Lithodomus*, etc., etc. . . . Blow, blow, blow, will it ever stop blowing so we may go to work outside again? We pick over siftings for hours until our eyes rebel against the strain. The amount of small and minute stuff is astonishingly great in the siftings. So much of this escapes detection when the material is wet. A most gratifying number of species of *Drillia*, *Mangilia*, and other Pleurotomids turn up this way. Especially noteworthy are the pretty *Ancistrocyrinx radiata* and *Niso interrupta*, both of which have a Chinese or Japanese appearance. Numbers of Pyramidellids are appearing in the pickings. We all like these graceful highly-sculptured little shells; the crew call them 'peakers.' I hope Bartsch will not get too much discouraged when he sees them. There are so many little bivalves that I have never seen before, and indeed many Gasteropods of genera wholly unknown to me. . . ."

(*To be continued.*)

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COLLECTING SHELLS FROM THE ABALONE.

BY T. S. OLDROYD.

At White's Point, four miles from San Pedro, California, is a station for the Japanese abalone gatherers. They go around to the different islands and places along the main shore where they are plentiful. The divers, in their suits, go down in from two to six or eight fathoms, pry the shells from the rocks, and put them in a sling net, and they are hauled on deck, the average day's work being from one to two tons. They are brought to the station, where the meat is taken out, boiled, dried in the sun, packed in cans and shipped, mostly to China, I am told, where they are considered quite a delicacy. The shells are piled up on shore, and are sold to jewelry and novelty manufacturers. The red abalone (*Haliotis rufescens* Swains.) they get on the island of Santa Cruz and places to the north of here, while the Green Abalone (*Haliotis fulgens* Phil.), the corrugated (*Haliotis corrugata* Gray), and the black (*Haliotis cracherodii* Leach) are found further south. The shells are not things of beauty to look at in their natural state, most of them being badly worm-eaten and covered with moss, barnacles and Vermetus tubes; *Lithophagus plumula* Hanl., and *Pholadidia sagitta* Stearns bore holes in the shells and sometimes bore through and the animal has to protect itself by covering them over with patches of nacre. Among the moss barnacles and Vermetus, are ideal protected places for the small and microscopic shells to live in. None of these live on the abalone exclusively, but in the protected places in the rocks and stones, as well. I do not know as they prefer the Haliotis to

the rocks, but I think he is a good-natured inoffensive big fellow and does not eat up his little neighbors and companions. We have a *Barleeia* that is said to be a lover of the Haliotis, but I have found but very few of them, the *Odostomia* being by far the most plentiful.

When it gets dull on the farm and we want a day's outing, Mrs. Oldroyd and myself go to White's Point for a day's collecting. We do not have to wait for a low tide or go near the water, but make us a comfortable seat at one of these large piles of shells and pick off the little shells till we get tired. We find out where the abalone comes from so as to get the locality of the small shells.

The following list is what we got in a few days' collecting, but this is nowhere near the limit to what might be found. They were determined from others in our collection, which were determined at Washington through the kindness of Doctors Dall and Bartsch:

Odostomia tenuisculpta Cpr.
Odostomia straminea Cpr.
Odostomia helga D. & B.
Marginella varia Sby.
Marginella regularis Cpr.
Marginella pyriformis Cpr.
Marginella jewettii Cpr.
Diala marmorea Cpr.
Diala acuta Cpr.
Triforis catalenensis Bartsch.
Triforis montereyensis Bartsch.
Eulima distorta Cpr.
Jeffreysia bifasciata Cpr.
Jeffreysia translucens Gld.
Rissoina dalli Bartsch.
Rissoa grippiana Dall.
Ethalia supravallata Cpr.
Vitrinella oldroydi Bartsch.
Cerithiopsis assimilata C. B. Ad.
Cerithiopsis cosmia Bartsch.
Bittium quadrifilatum Cpr.
Bittium rugatum Cpr.
Turbonilla buttoni D. & B.
Turbonilla tenuicula Gld.
Leptothyra bacula Cpr.
Phasianella pulliodes Cpr.
Eulithidium substriatum Cpr.
Calliostoma supergranosum Cpr.
Erato columbella Mke.
Lacuna unifasciata Cpr.
Isapis fenestrata Cpr.
Megatebennus bimaculatus Dall.
Amphissa versicolar Dall.
Mitramorpha aspera Cpr.
Mitramorpha filosa Cpr.
Columbella penicillata Cpr.
Barleeia subtenuis Cpr.
Barleeia haliotiphila Cpr.
Placiphorella velata Cpr.
Anachis subturrita Cpr.
Lepidopleurus oldroydi Bartsch.
Lepidopleurus nexus Cpr.
Acanthochites diegoensis Pils.
Trachydermon dentiens Gld.
Crepidula dorsata Brod.
Lyonsia inflata Conr.
Lima dehiscens Conr.
Cardita subquadrata Cpr.

Mangilia nitens Cpr.
Aesopus myrmacoon Dall.
Tornatina harpa Dall.
Leptothyra paucicostata Dall.
Leptothyra paucicostata var. rubra Dall.
Kellia laperousii Desh.
Lasea rubra Cpr.
Saxicava arctica Linn.
Bryophila setosa Cpr.
Sphaenia californica Conr.
Hipponix tumens Cpr.

LAND SHELLS OF MONROE CO., PENNSYLVANIA.

BY H. A. PILSBRY.

During September, 1909, I spent a couple of weeks at Bartonsville, Monroe Co., Pa., and employed some of my leisure in collecting shells. The country rock is a shale of Hamilton age. The shells were mostly taken on a steep, stony, wooded hillside facing east, and in a pasture under stones. The species taken are for the greater part common. See also NAUTILUS XXI, p. 67, where Mr. Joshua Baily, Jr., lists Monroe County shells.

Polygyra albolabris (Say).
Polygyra tridentata (Say).
Polygyra fraterna (Say).
Polygyra hirsuta (Say).
Pyramidula alternata (Say).
Pyramidula cronkhitei catskillensis (Pils.).
Helicodiscus parallelus (Say).
Punctum pygmæum (Drap.).
Sphyradium edentulum (Drap.).
Vitrea hammonis (Ström).
Vitrea rhoadsi (Pils.).
Vitrea indentata (Say).
Euconulus chersinus (Say).
Zonitoides arborea (Say).
Zonitoides minuscula (Binn.).
Gastrodonta suppressa (Say).
Succinea ovalis Say.
Vallonia excentrica St.
Vallonia costata (Müll.).
Bifidaria pentodon (Say).
Vertigo ovata Say.
Vertigo gouldi Binn.
Cochlicopa lubrica (Müll.).

NEW CUBAN UROCOPTIDÆ, II.

BY PROFESSOR CARLOS DE LA TORRE.

(*Concluded from p. 48.*)

UROCOPTIS (GONGYLOSTOMA) TURGIDA n. sp.

Shell rimate, swollen-cylindric, rapidly tapering to a truncate cone above; suture simple. Whorls 8–9, a little convex. Brown, mar-

bled with zigzag whitish flames; last whorl violet-brown. Surface shining, weakly ribbed striate. Aperture large, transversely ovate-oblong, with the internal axial fold strong. Axis encircled by two, rarely three, compressed lamellæ, the lowest broadly expanded in the last two whorls; other axial characters as in *U. proteus*.

Long. 25, diam. 8.6, ap. long. 6.2, ap. diam. 5.2. Whorls 9.

Long. 20, diam. 7.5, ap. long. 5.6, ap. diam. 5. Whorls 8.

Long. 22, diam. 8.6, ap. long. 6, ap. diam. 5. Whorls 8.5.

Var. "a." Smaller, more swollen-fusiform.

Long. from 16 to 19 mm.; diam. 7 to 8 mm.

Central Cuba; Sierra de Bamburanao near Seibabo de Yaguajay, province of Santa Clara.

This may be regarded as a more obese member of the *U. proteus* group. Both forms live in the same locality, but *U. proteus* dwells under stones, while *U. turgida* finds a permanent habitat on the upper side of stones.

Urocoptis (Gongylostoma) uberrima, n. sp.

Shell rimate, ovate-oblong, very inflated, more swollen above the middle and rapidly terminating in a narrow concave truncation; somewhat solid; pale chestnut colored indistinctly clouded with darker brown and with whitish areas, last whorl purplish brown. Surface obliquely regularly rib-striate; suture simple. Whorls 7–8, a little convex, the last shortly free in front, with a cord-like keel around the base. Aperture transversely ovate, brown within, the peristome, columella and upper wall, white. Axial fold prominent. Peristome expanded and reflexed. Axis encircled by two subequal lamellæ above the middle, somewhat stout, and by three lamellæ in the antepenultimate and penultimate whorls, the lower the largest.

Long. 17, diam. 8.2, ap. diam. 4.5, ap. long. 5.2. Whorls 8.

Long. 14.5, diam. 8, ap. diam. 4.3, ap. long. 5. Whorls 7.

Long. 16, diam. 8, ap. diam. 4.2, ap. long. 5. Whorls 7.5.

Central Cuba; Sierra de Santa Rosa, between Remedios and Seibabo de Yaguajay, Prov. of Santa Clara.

Differs from *U. turgida* by its smaller size, obovate shape, less distinct color pattern, and by the axis.

Urocoptis (Gongylostoma) intuscoarctata, n. sp.

Shell similar externally to *U. cioniscus* but the axis bears two

small sub-equal compressed lamellæ above, the upper one disappearing or becoming a low cord at the middle, and the lower, denticulate above, expands in the antepenultimate whorl into a somewhat upward flaring broad plate, as in *U. fabreana:* in the last two whorls this lamella is reduced again, almost disappearing in the last one.

Long. 29, diam. 6, apert. diam. 5.3. Whorls 13.

Long. 23, diam. 5.6, apert. diam. 5. Whorls 10.

Long. 25, diam. 6, apert. diam. 5.2. Whorls 10.

Central Cuba; Sierra de Canoa at Las Llanadas, District of Mayajigua, Province of Santa Clara.

This species belongs to the Section *Esochara* Pils. and Van., and is near *U. fabreana*, but differs in color, the close riblets, whorls more convex, and chiefly by the upper lamella of the axis not being obsolete above. Affinities with *U. intermedia*, etc., are evident.

UROCOPTIS (GONGYLOSTOMA) DIMIDIATA, n. sp.

Shell very similar externally to *U. turgida*, though differing in color, the whitish flames being fewer and less undulated. Axis (as in *U. strangulata*) "with two spiral lamellæ above, the lower one expanding in a broad, flat plate or spiral disk in the antepenultimate and penultimate whorls, nearly reaching the outer wall of the cavity." In the last whorl this lamella is reduced and the upper one effaced.

Long. 28, diam. 9, ap. diam. maj. 7.2, ap. diam. min. 6.2, whorls 10.

Long. 22, diam. 8, ap. diam. maj. 6.6, ap. diam. min. 6, whorls 8.

Long. 25, diam. 8.8, ap. diam. maj. 7, ap. diam. min. 6, whorls 9.

Central Cuba: Vereda de los Boqueles, over the mountain near Aguada, district of Mayajigua, province of Santa Clara.

The rejected portion of the spire (7 to 8 whorls) rapidly and concavely tapering, striate, with the two and one-half embryonic whorls smooth, corneous and slightly bulbous. Differs from *U. strangulata* by its swollen shell, color pattern, less widely-spaced riblets, larger and transversely ovate aperture, etc. From *U. intuscoarctata* differs by these same characters and also by the more expanded disk of the lower lamella, and the upper one effaced only in the last whorl.

U. DIMIDIATA INTERMEDIA, n. var.

Differs from typical *U. dimidiata* in more slender contour of shell. Its color is corneous, with occasional inconspicuous brown streaks. Aperture sub-circular.

Long. 26, diam. 6.8, ap. diam. 5.4, whorls 11.

Long. 21, diam. 6, ap. diam. 5, whorls 9.

Long. 23, diam. 6.5, ap. diam. 5.2, whorls 9.5.

On stones: Vereda del Chorreron, near Aguada, in the district of Mayajigua, province of Santa Clara.

An entire small specimen contains 16 whorls and has a length of 25 mm. This variety is somewhat similar to *U. fallax*, but internally it is intermediate between *U. dimidiata* and *U. intuscoarctata*.

Urocoptis (Gongylostoma) alvearis, n. sp.

Shell thin, shortly rimate, oblong, widest above the middle; spire tapering to a very short truncate cone; brown, becoming purple-brown on last whorl. Sculptured with narrow, oblique, whitish ribs separated by spaces about four times width of ribs. Whorls 7–9, slightly convex, the last very shortly free, its base defined by a very low or obsolete cord. Aperture nearly circular, dull purple within; columella and upper portion of the peristome white. Peristome broadly expanded and the upper margin reflexed. Columellar lamella prominent. Axis with two compressed lamellæ, the lower one larger, broadly expanded in the last two whorls, forming a horizontal disk extending one-third distance from axis to outer wall.

Long. 20, diam. 9.2, ap. long. 6.7, ap. diam. 7.2.

Long. 16, diam. 8, ap. long. 5, ap. diam. 5.5.

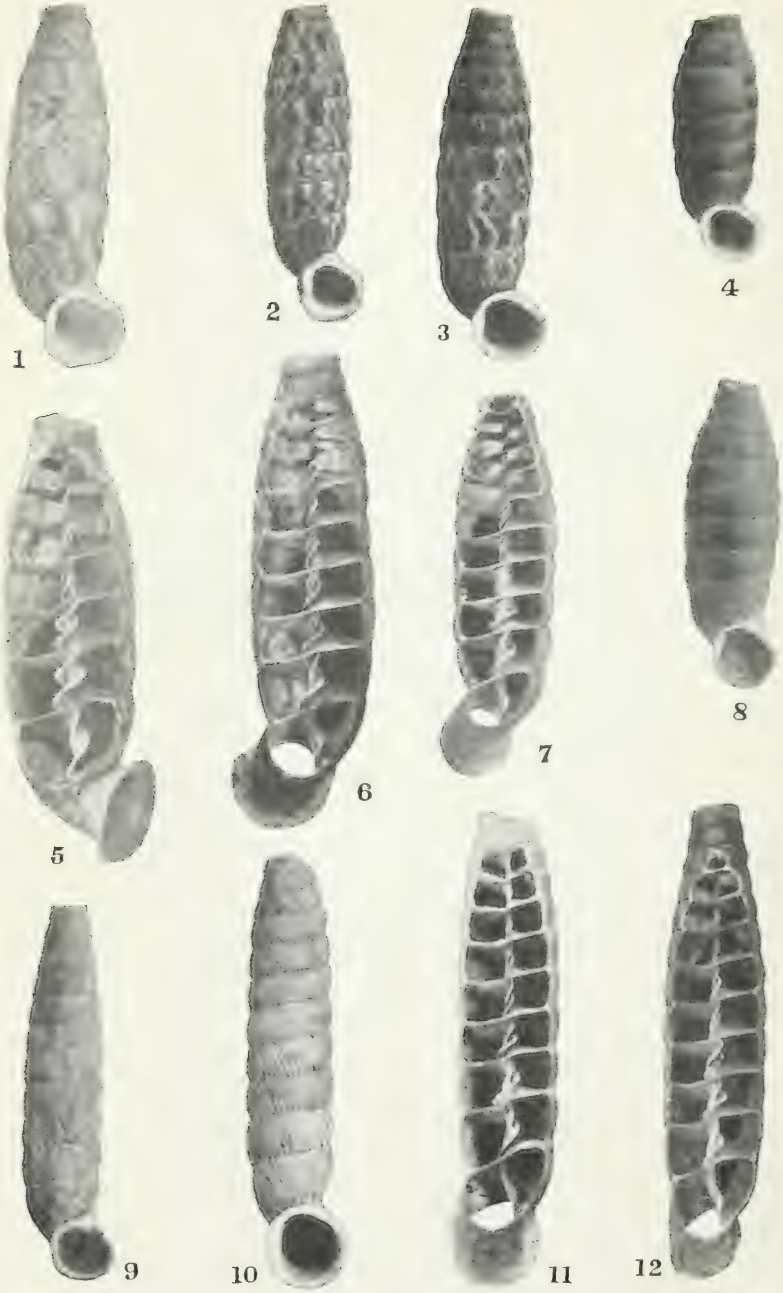
Long. 20.8, diam. 8, ap. long. 6, ap. diam. 6.5.

Central Cuba: La Puntilla, near Remedios, in the Santa Clara province.

Differs from *dimidiata* and *turgida* by the shorter, broader shape and much more widely-spaced ribs and less expanded axial disk. The two and one-half embryonic whorls are smooth and very convex, as in other species of this group, with a diam. of 1.4 mm. The following four whorls are weakly and very obliquely striate, after which the ribbed sculpture is assumed, irregular and rather weak at first, but becoming strong and regular on the eighth whorl. The first eight whorls increase in diameter very slowly, after which the shell abruptly expands.

Urocoptis (Gongylostoma) tuba n. sp.

Shell similar to *U. alvearis* in color, sculpture and axial plan but differs from that species by its more slender contour and by the much



NEW CUBAN UROCOPTIDÆ.

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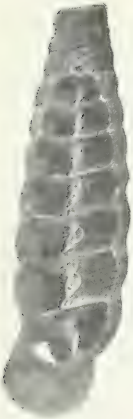

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NEW CUBAN UROCOPTIDÆ.

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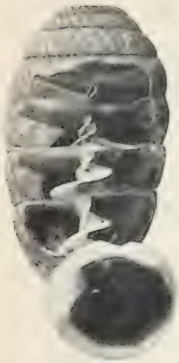
NEW CUBAN UROCOPTIDÆ.



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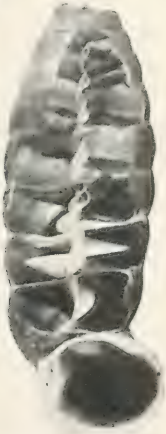

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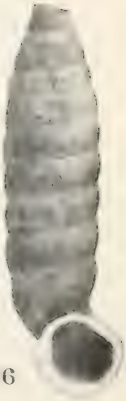

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NEW CUBAN UROCOPTIDÆ.

more gradually tapering spire, the lateral outlines of which are not so deeply concave.

Long. 24.5, diam. 7.5, ap. long. 6.3, ap. diam. 6.5, whorls 10.

Long. 20.3, diam. 7.1, ap. long. 6.5, ap. diam. 6.9, whorls 7.

Central Cuba; Cerro de Guajahana near Caibarien in the Province of Santa Clara.

Reference to Plates IV–VII.

Plate IV.

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A GOOD COLLECTING GROUND FOR SMALL SHELLS.

BY W. F. CLAPP.

The shells listed below were gathered at High Pines, Duxbury Beach, Mass. High Pines is a small hummock, separated from the mainland and any vegetation by eight miles of beach and sand dunes. The hummock itself which is only an acre in area, is covered with a dense growth of scrub oak, beach plum and sumac.

Considering the above conditions, it is interesting to note the quantity of specimens obtained from one square yard. I have included in the list approximately the number of specimens of each species found. Several of the species listed I have been unable to find in Duxbury on the mainland, and, on the other hand, species found in considerable quantities in Duxbury do not appear to inhabit High Pines.

On old charts of Duxbury Beach, the area connecting High Pines with the mainland appears as thickly wooded, but storms have removed all visible evidences of the former vegetation.

"For the benefit of those from Missouri," I will add, that I have a small quantity of soil similar to that from which these shells were taken, and will be pleased to divide the spoils with anyone caring to sort out the remainder, and thus verify my figures.

Vallonia pulchella Müller	1800
Zoogenites harpa Say	770
Pupilla muscorum Linn.	450
Zonitoides arborea Say	270
Cochlicopa lubrica Müll.	150
Helicodiscus parallelus Say	75
Helix hortensis Müller	25
Vertigo milium Gould	60
Vitrea hammonis Strom.	28
Bifidaria curvidens Gould	24
Punctum pygmaeum Drap.	23
Succinea ovalis totteniana Lea	17
Pyramidula cronkhitei anthonyi Pils.	2
	3694

EXTRACTS FROM THE LOG OF THE EOLIS.

BY JOHN B. HENDERSON, JR.

(*Concluded from p. 72.*)

"May 30, 1911" (off Key West). ". . . 6 a. m.—We take a position about where we failed yesterday in 50 fathoms, using the medium dredge for several unsuccessful hauls; then we bend on 'old Sampson' (our largest and heaviest dredge) and lower away. This time the bag comes up full of large broken shells, mostly Pectens and large bivalves all dead and worn, from shallow water; this is no good at all. Run out to 90 fathoms and make three very good hauls on the edge of the Pourtales Plateau. The features of the bag are some very interesting Murices of the *Pteronotus* group with wide foliated varices and quite suggestive of certain Pacific Coast species. Also *Murex beauii*, a very fine species of that fine genus. We especially rejoice over these Murices for with them added to our records we have nearly completed the list of Atlantic Coast Muricidæ. *Voluta dohrni*, *Calliostoma bairdii*, a superb *Fusus eucosmia* twice the size of any specimens I have ever seen. It nearly took our breath away. . . . The clearness of the water here is most striking. We always watch over the side of the boat to see who will first distinguish the dredge as it is being hauled up by the power winch. Its white skirts begin flashing so far below the surface we have been speculating upon the actual distance. We measured the rope to-day and found that we could actually see the dredge at 104 feet."

"June 11, 1911" (Key West). "In bagging the dried siftings of a haul made yesterday in 90 fathoms, we made the splendid discovery of a *Haliotis*. This is probably *Haliotis pourtalesii* of Dall, described by him from memory of the unique specimen which was destroyed in the Chicago fire. Pourtalès obtained his specimen right about here. This one just taken is now the only specimen 'in captivity.' We are quite excited about it . . . alas, we need all the cheer we can find, for the loss of our two carefully designed traps and 'old Sampson,' all in one day, has cast a gloom upon us . . . 61 fathoms, a fragment, though brightly colored, of *Voluta junonia*, the first in our records."

"June 6, 1911" (Key West). ". . . proceeding out we meet a stiff wind with swell and a nasty chop on top, but we try out a few

hauls nevertheless in shallow water, 20 fath. Position, close to outer edge of Florida Reef. Excellent bottom, though not very rich in mollusks. An apparently new *Scala*, with deeply channelled sutures, giving it a pagoda-like appearance, the ribs quite obsolete. The animal placed in alcohol at once exuded a large amount of purple liquid. We are pleased to see that it is possible to dredge in so rough a sea, but when wind, sea and current all pull together, it is hard."

"June 9, 1911" (Tortugas Islands). ". . . about three miles out from the big red sea buoy, five hauls on rough to hard sand bottom,—the poorest five hauls that any one ever made. One bright spot in the morning's work is a living *Voluta junonia*, a young specimen, but at last we may say that we have collected this rare and most desirable shell alive." . . . (on Garden Key, Tortugas). ". . . we discover a patch of coral rock making out from shore and we fall greedily upon it. The rock extends out but a short distance to the edge of the dredged channel to the Fort; there the bottom falls steeply to a depth of about thirty feet, the water being clear as crystal. Upon this pile of half-submerged rock we obtain some delightful collecting. Very fine specimens of a small race of *Cypraea exanthema* are abundant along with the usual run of reef species, all shells being very free of calcareous deposits. Red and yellow Pectens are abundant, clinging, for the most part, to the rocks by byssi; there are also pure white Limas that display their wonderfully-decorated mantle edges; they are very agile and dart about by a rapid spasmodic opening and closing of their shells. The larger specimens are always fixed by the byssus in crevices of the rocks. The Trochids and *Turbinidæ* are especially well represented on this reef. To facilitate our work we all enter the water regardless of clothes. It is too deep for rubber boots, the sun is too powerful for naked backs. We vary our labors by an occasional swim about the outer edge of the rocks,—it feels so odd to be fully clothed in the water . . . this little reef is perfectly delightful. A large quantity of exquisite fish of the 'Angel fish' type,—veritable butterfles as to color—hover about, almost touching our hands and acting in the most friendly and confidential manner, yet always skilfully avoiding capture by just eluding one's grasp; they seem not in the least frightened by such hostile demonstration. Now and then large fish weighing ten to twenty pounds come leisurely swimming along and inspect us

carefully, and then decide to hang around awhile. We are in a perfect aquarium,—a part of it—and we are upon the most intimate terms with all the other inhabitants. Great care must be taken to avoid touching the sharp-spined sea-urchins, especially the *Diadema*, whose purple and black spines are six inches long and as sharp as needles, brittle as glass and poisonous . . . such a wealth of crustacea, such beautiful Eolids with green and yellow filagree-work along their backs; they crawl over one's hands under water like caterpillars; such stealthy Octopi sneaking over the rocks,—one recoils from them as from a snake. How fascinating this reef collecting is. Poor Clapp; if these were only land shells, how much more he would enjoy it. . . ."

NOTES.

A Conchologist's Directory.—The undersigned intends publishing, on or before January 1, 1912, a Directory of American Conchologists. No charge is made for inserting names and addresses, but if a copy of the Directory is desired, send 25 cents as early as possible.

Persons ordering in advance may choose a subject and have the same designated after their name. Conchologists should state if they have a collection, the size of the same, and whether exchanges are invited, etc.

If sufficient interest is shown, the Directory will be published annually until the formation of a national society. Address,

Maxwell Smith, Hartsdale, N. Y.

Teaching Natural History.—So far as I know, this is the only high school in America where an effort is made in the regular zoology classes to teach pupils the systematic collection and naming of our common insects and shells. This may be right or it may not, but the unusual interest manifested in our classes urges me to write this, thinking that it may be helpful to others. I shall speak of the shells only.

I read to all my classes the peculiar incident told by Mr. Henderson in his Cuban trip collecting *Urocoptis elliotti*. It will open the eyes of over 100 boys and girls to see things when they go to Cuba.

I say "see" advisedly, for they have already seen two very remarkable things right here at home. The first was a find of *Valvata* in Washington Park, and the second a remarkable find of five species of land shells at 63d and Prairie Ave., where the South Side elevated "goes round the bend." There were hundreds of *Pyramidula striatella*, *Zonitoides*, *Vitreas* and *Vallonias*. These, mind you, were brought in by pupils who a month ago knew not of their existence. They also visit the greenhouses and pick up *V. draparnaldi*. And the keepers help them in their search. If we have no shell collectors in the next generation 'twill be no fault of mine.—E. E. Hand, Department of Zoology, Wendell Phillips High School, Chicago.

Nine hundred and twelve Pearls in one Unio.—W. H. Toms, a clam-digger of Adrian, Mich., found 912 pearls in a Raisin River clam. One hundred were of marketable size. Fifty are beauties, for which he expects a fortune.—*Public Ledger, Phila.*

Collecting on the Sipsey River, Alabama.—Since writing last I have made several excursions to the Sipsey. You will remember that, after my work at the Forks, we considered it rather a poor stream for *Unionidæ*. My present impression is that it is going to turn out one of the richest in Alabama, and decidedly peculiar. It is, in fact, very different from other rivers which I have explored. Most of it is "dead water," with a steady, pretty strong current and three or four feet deep; it is very crooked and choked with drift logs. Now and then there are gravel shoals, shallow, with an even, strong current, and these are the places for the mussels, especially *Pleurobemas*. These gravel shoals are altogether peculiar in my experience. The bottom is a layer of gravel, a foot or so thick, cemented so that it is quite hard; under this there is loose gravel, in which the mussels generally live. At the Forks I used to wonder why the muskrats left so many shells and I found so few. A farmer there, who had taken out river gravel for a road, gave me the explanation, which I have verified: only a few mussels are in the top layer, but great numbers of them under the cemented portion; the muskrats get to them through small crevices. The proper way to work these shoals will be to have a man dig away the cemented part, which is not very hard, and get to the layer beneath.—H. H. Smith.

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A NEW GENUS OF BIVALVES FROM BERMUDA.

BY WILLIAM HEALEY DALL.

Among various minute shells sent for examination to the National Museum by Mr. Arthur Haycock, of Bermuda, is a minute triangular bivalve which at first looks like a very small, solid *Cumingia*, but on careful scrutiny under a compound microscope proves to be a new genus of the family *Mesodesmatidæ*. One complete specimen and a single valve are in the collection of Mr. Haycock.

ARGYRODONAX, n. g.

Shell small, concentrically sculptured, porcellanous, with a minute, smooth, nearly circular prodissoconch. Hinge formula $\frac{\text{L.1.0r101.1}}{\text{R.0.1r010.0}}$. Pallial sinus large and deep, muscular scars large and strong; possessing a feeble external ligament and a narrow but strong resilium. General form tellinoid. Type:

ARGYRODONAX HAYCOCKI, n. sp.

Shell small, white, subtriangular, attenuated behind; sculpture of concentric threads growing coarser and more or less irregularly grouped toward the margin; lunular space impressed but not defined by any limiting sculpture; there is no escutcheon; ligament feeble, short, amphidetic external; resilium narrow, strong, situated in front of the posterior left cardinal tooth, and in the right valve in front of a ridge, which may be a feeble cardinal tooth or merely the raised

edge of the resiliifer; the right valve has a short, stout anterior and a high, thin, elongate posterior lateral tooth; both the laterals fit under the margin of the left valve with no obvious sockets. The anterior end of the shell is longer than the posterior, and is rounded; the shorter posterior end is subtriangular; the muscular scars are large for the size of the valve, especially the posterior scar; the pallial sinus is deep, high, rounded behind, confluent with the pallial line below.

Length 5.5, height 4.5, max. diam. 2.6 mm.

Habitat: Bermuda.

This shell is perhaps nearest to *Anapella*, which has no pallial sinus and a simpler hinge-armature. I know of no other genus of the family which can be said to approach it more nearly.

A NEW BRACHIOPOD FROM BERMUDA.

BY WILLIAM HEALEY DALL.

Another of Mr. Haycock's interesting discoveries is a small brachiopod belonging to the genus *Argyrotheca* (formerly *Cistella*), which occurs in the shell sand of Bermuda.

ARGYROTHECA BERMUDANA, n. sp.

Shell minute, varying from nearly circular to slightly quadrate-rounded, with a feeble concave median inflection of the hæmal valve which does not obviously undulate the distal margin. Color white, clouded with pale scarlet; area wide, smooth, with a very large triangular opening for the pedicel; surface smooth with rather large punctations. Hinge teeth short, strong. Ventral valve with a median, rather low septum, extending nearly to the distal margin. Hæmal valve with a strong septum, widest distally and with a distinctly serrate front edge. Apophyses broad and horizontally incurved, and in large part free from the valve except near the septum. The largest specimen is 2.5 mm. wide and about as high, moderately convex.

None of the specimens contained the remains of the animal. In form and character this is a very distinct species; in color it may be

compared to *Fremulina pulchella* Gray. It cannot be confounded with the heavily ribbed Antillean *A. rubrotincta*.

A NEW CALIFORNIA EUPLEURA.

BY WM. H. DALL.

The following species was dredged off San Diego, outside the kelp beds, in 15 fathoms, by Mr. C. W. Gripp, whose success in getting new and interesting forms is well known to readers of the NAUTILUS:

EUPLEURA GRIPPI, n. sp.

Nucleus small, of a single whorl or slightly more, dark chestnut-brown in color, smooth and slightly tilted, followed by four and a half subsequent whorls, with the inception of which the sculpture changes abruptly; the first has two, the second three, the third four spiral threads between the periphery and the subsequent suture; the two original threads stronger than the others, but all becoming relatively feebler, and on the last whorl obsolete; the posterior slope of the whorls is smooth except for lines of growth; on the last whorl there are very obscure indications of obsolete spiral sculpture; the whorls have, in the type specimen, about five obscure nodes at the shoulder, reminiscent of the varices of the other species of the genus; whorls increasing in size rapidly, the shoulder slope flattish, situated at the posterior third on the last whorl, the suture distinct but not appressed; aperture ovate, the body with a light glaze, the outer lip thickened, sharp-edged, tinged with orange color; the type has eight small denticles within on the callus; canal short, open, slightly recurved; general tint of the type specimen dark, livid, olive color; operculum muricoid.

Height of shell 21.5, of last whorl 18.0, of aperture excluding the canal 10.0; max. diameter of the shell 11.0, of the aperture 6.2 mm.

The animal, like that of the other species, is purpuriferous. It presents a strong contrast to the other species of the genus in its general smoothness and absence of conspicuous sculpture and the bright color of the lip.

NOTE ON PACHYCHEILUS VIOLACEUS PRESTON.

BY CHARLES T. RAMSDEN,
Guantanamo, Cuba.

This species, the largest Melanian of Cuba, was described by Mr. Preston in the Proceedings of the Malacological Society of London, ix, p. 199, March, 1911, the locality being indefinitely given as "Cuba, alt. 2000 feet." The circumstances of the discovery of this remarkable species may be of interest. I found it in the Santa Maria river at Camp Yberia, 2000 feet above sea level, on September 17th, 1909. This place is 25 miles west of the city of Baracoa, on the north coast of Cuba. The hills in which Camp Yberia lies are known as the Sierra del Cupey, and the place is by no means easy of access.

The shells are quite abundant, all being squarely truncated. They are purplish-brown, almost black, with indistinct light bands below the suture, at the periphery and around the axis. These bands show distinctly on looking through the shell from the inside. Or the shell might be described as pale olive, with two broad purple-brown bands. The surface has the fine striation of the Central American species of *Pachycheilus*.

THE USE OF THE GENERIC NAMES UNIO, MARGARITANA, LYMNIUM AND ELLIPTIO, AND OF ANODONTA AND ANODONTITES.

BY A. E. ORTMANN.

Recently an attempt has been made to show that the general use of the old names of *Unio*, *Margaritana* and *Anodonta* is not correct, but that they should give way to *Lymnium*, *Unio* and *Anodontites*, respectively. This was first indicated by Thiele (Nachr. Bl. deutsch. Malakozool. Ges. 41, Heft 1, 1909, p. 29) and carried out by him subsequently (J. Thiele, Mollusken, in: Brauer, Suesswasserfauna Deutschlands, Heft 19, 1909, pp. 32–35).

I. To the first change (*Unio* into *Lymnium*, etc.) an objection was promptly taken by F. Haas (Nachr. Bl. deutsch. Malakozool. Ges. 41, Heft 2, 1909, pp. 68–72), to which, however, Thiele replied, maintaining his view (Beitr. Kenntn. mitteleurop. Najaden, Beil. Nachr. Bl., etc., No. 3, 1909, p. 48).

The evidence offered for either view may be condensed as follows:

The original genus *Unio* of Retzius, 1788, contains species both with and without lateral hinge teeth, and no type is named. In 1792 Bruguière describes the genus *Unio* as possessing such teeth, without saying, however, what is to become of those species which have no lateral teeth. In 1815 Oken divided the genus *Unio*, calling the species with lateral teeth *Lymnium* and those without teeth *Unio*. In 1817 Schumacher did the same, but retained *Unio* for the species with teeth, while for those without teeth he introduced the new generic name *Margaritana*.

Thiele now claims that Oken was the first to *split* the old genus, and that his names have the priority, while Haas claims that Bruguière had the *intention* to split the old genus, and that he thus has the priority over Oken. With reference to the latter claim, Thiele says that there is no evidence whatever in Berguière's paper to show that he intended to divide the genus *Unio*.

Both authors are right. Bruguière *may* have had the intention of dividing the genus, but there is no positive proof of it, and as long as the dispute concerns the possible *intentions* of Bruguière the question will never be settled. But I should like to offer here two suggestions which probably will help us.

(1) *Unio* Retzius is a genus *without a type, but with a diagnosis*, which includes species with and without lateral teeth. No matter what the *intentions* of Bruguière were, the *fact* remains that he, with a full knowledge of Retzius' diagnosis, *gave another diagnosis*, in which he mentions only the presence of lateral teeth. Thus, although we cannot say that the genus *Unio* has been *split* or *divided*, surely the concept has been changed and *restricted*. This is a perfectly legitimate way in nomenclature, and thus Bruguière introduced the first change in the definition of the genus, and consequently has the priority over Oken. Oken, according to our modern rules, had no right any more to use *Unio* in such a way that it would exclude all of Bruguière's species.

(2) *Unio* Retzius is a genus without a type, that is to say we do not know which one of the six species enumerated by Retzius is *the* type. Yet looking again at the diagnosis, we see it says that in "most" species (*in plurimis*) lateral teeth are present. This makes it perfectly clear that Retzius regarded the absence of lateral teeth (in one species) as an exception to the rule, while the other five spe-

cies represent the rule, or typical condition. While we thus do not know the type, we know, on the other hand, *which species should not be the type.*

Now if any subsequent author is to select a type species, this latter surely should correspond to the original diagnosis, and should represent the rule but not the exception. Haas cites a rule of the international code of nomenclature (section 35), which says that no species should be selected as type which has only "doubtfully" been assigned to the genus by the original describer. Of course, taken verbally, this rule does not entirely fit the present case, but without much difficulty it might be stretched so as to cover it. If *U. margaritiferus* is selected as type, as Oken does, a species is taken which is abnormal and does not fully correspond to the original diagnosis, while a number of species which do fit the original diagnosis are thrown out. While Bruguière's change in the diagnosis consists only of the dropping of the word "most" (*plurimis*), thus throwing out the exceptional case only, Oken's definition of the genera involves a complete change, for instead of having lateral teeth "in most cases," as formerly, *Unio* now has "never any" lateral teeth, practically the opposite.

These two considerations are, as far as I can see, consistent not only with common sense, but also with the rules of nomenclature. There is no rule which says that an author has no right to change the concept of a genus by modifying the diagnosis, as long as one or some of the original species remain included, and this is what Bruguière has actually done, and we see it black or white before us. And further, in doing this, Bruguière simply carried out an idea already suggested by Retzius, namely, that the genus *Unio* consists of a number of species representing fully the normal condition of the genus, and of an additional one which forms an exception.

Consequently Bruguière has the priority, and *Lymnium* of Oken becomes simply a synonym of *Unio*, as restricted by Bruguière. For the remaining species (*U. margariferus*) Schumacher's name *Margaritana* is to be used.

I may mention here incidentally that a number of North American species are retained under the genus *Unio* by Simpson. I do not think that they should remain congeneric with the European forms, for reasons which will be set forth in another paper. For most of the American forms the generic name *Elliptio* Rafinesque, 1819,

which has been used by Simpson for a section of *Unio*, will be appropriate, and its use will conform to the rules of nomenclature. The type species of *Elliptio* is *U. crassidens* Lamarck. Congeneric are at least the following species: *gibbosus* Barnes, *complanatus* Dillwyn, *fisherianus* Lea and *productus* Conrad, and probably most of the other North American species, at least those which group with the species named.

II. The substitution of *Anodontites* Bruguière, 1792, for *Anodonta* Lamarck, 1799, has also been advocated by Thiele (l. c.), and is not objected to by Haas (l. c.).

I think this case is absolutely clear, and there is no earthly reason for this change. *Anodontites* was created by Bruguière in order to describe a new species, *A. crispata*, from South America. He also says that several other species belong to *Anodontites*, two of Linnæus, which he names, and seven others which he does not mention. This leaves not the slightest doubt that *Anodontites crispata is the type of Anodontites*. It is the first species described under this generic name, and it consequently always has to remain with this genus unless the latter is dropped for other reasons. In Simpson's synopsis, however, this species stands under *Glabaris* Gray, 1847. This is against the rules. Since there is no objection whatever to the generic name *Anodontites*, *Anodontites crispata* has to stand, and all other species of the modern *Glabaris* have to go with it, so that *Glabaris becomes a synonym of Anodontites*, which is a South American genus. This opens the way for the admission of Lamarck's *Anodonta*, the type of which is, according to Simpson, *Mytilus cygneus* of Linnæus.

We may now rejoice, for we have three valid generic names among the Najades which we must not confuse, *Anodontites* Bruguière (= *Glabaris* Gray), *Anodonta* Lamarck and *Anodontoides* Simpson, disregarding the synonyms *Anodon* Oken, *Anodontes* Cuvier, *Anodontopsis* Simpson and the fossil *Anodontopsis* McCoy.

THE LAND SHELLS OF GARDEN KEY, DRY TORTUGAS, FLA.

BY GEORGE H. CLAPP.

While at Key West last June on the "Eolis," Henderson and I were invited by Dr. Alfred G. Mayer, in charge of the Carnegie Institution Biological Station on Loggerhead Key, Dry Tortugas, to

come over and make a call. As it was only a matter of about 65 miles each way we decided to accept, so the day after their boat, the "Anton Dohrn," started we followed, and spent four delightful days on and around the keys.

Our anchorage was just off Fort Jefferson, Garden Key, and knowing that the Fort had been occupied for a great many years we thought there might be some land shells. A careful turning over of boards, bricks and stones inside the Fort yielded nothing but an occasional scorpion. Finally Henderson climbed to the top of the old magazine, which was covered with a heavy growth of vines and weeds, and almost immediately turned up an *Opeas micra*. We then discovered a *Bifidaria* on the under side of a brick, so gathered a lot of dirt and dead leaves which on picking over yielded the following:

Opeas micra (Orb.). Very common, mostly dead.

Bifidaria rupicola (Say). Not common, many alive.

Bifidaria hordeacella Pils. Common, mostly dead.

A careful search under stones and boards on top of the Fort yielded nothing.

On the beach among drift I picked up four dead, bleached *Polygyra c. carpenteriana* (Bld.) and two immature *Cerion incanum* (Binn.), evidently "floaters" from one of the eastern keys.

A FEW SUGGESTIONS.

BY V. STERKI.

Can the NAUTILUS give a little space for a few suggestions which it is hoped will not be offensive to the readers and collaborators, but meet with approval and—application?

1. The terms "Land and Freshwater Mollusca," or "Terrestrial and Fluviatile," or even "Extra-marine," are somewhat lengthy and cumbersome. We might say "Inland Mollusca" somewhat like the German "Binnenmollusken," and even more expressive. In a short time we should be accustomed to it and find it convenient.

2. The terms "Malacology" and "Malacologist," generally used elsewhere, have been used occasionally also by American writers in preference to "Conchology" and "Conchologist," which date from

the time when the shells, or conchæ, were the things collected and studied. Now we are studying mainly the soft parts; better, the animals, "Malacozoa," and might as well use the proper term. Malacology is a permissible, or excusable, abbreviation of malacozoology.

3. In somewhat the same sense we still are too much accustomed to the word "Shells" used indiscriminately. "Land Shells of North America" or the "Shells of Tennessee" is improper. In the first place we really mean the animals, and in the second there are many snails without any shells. The words "Snails," "Mussels" and "Slugs" are not objectionable, have been used, and their meaning is clearly defined. Restrict the use of "Shell" to what it really means.

4. In looking over the files, *e. g.* of the NAUTILUS, we find scores of heads of articles like, "A New Species of Unionidæ." If the name of the species described were the title we would not only at once know what it is, but it would be easier to find a certain article, and registration would be simplified.

New Philadelphia, Ohio, Sept., 1911.

NOTE ON A NEW ABRALIOPSIS FROM JAPAN.

BY S. S. BERRY,
Stanford University, California.

Preserved among some miscellaneous invertebrates in the Stanford University collections were found specimens of a very distinct and interesting new species of *Abraliopsis*, with respect to which the following notes may be regarded as merely preliminary to a more extended account in a paper now in hand.

Abraliopsis scintillans, new species.

Animal small, mantle elongate conical, tapering; fins large, broadly sagittate, well produced posteriorly to an acute point, about two-thirds as long as the body.

Head large, flattened, with large, prominent eyes.

Arms moderate, nearly of a length, their relative order 4, 3 = 2, 1 (the dorsal arms counting as 1); armed for the most part with 11–12 small alternating hooks, but these give place to two rows of

minute suckers at the tips, except on the ventral pair, which show the usual modifications.

Tentacles as long as the mantle, their clubs not expanded; armed with four rows of small suckers over the distal two-thirds of the club, proximal to these a ventral row of two large hooks opposed by a dorsal row of 4–5 very minute suckers. Fixing apparatus composed of four suckers and four pads alternating in two rows.

Photophores numerous on the ventral aspect of the mantle, bilaterally arranged but not in clearly defined series; on the funnel in about ten rows; on the lower surface of the head nearly as many, including a distinct circlet about each orbit; on the ventral arms three rows, only one of which persists to the tip; on the third arms one short row.

Length of mantle 59 mm., of fins 39 mm., width across fins 38 mm., length of ventral arms 27 mm.

Habitat: Japan.

NOTES.

An Additional Record for Helix hortensis Müll.—Dr. Percy E. Raymond, of the Geological Survey of Canada, has recently sent to the Carnegie Museum 21 specimens of *Helix hortensis* from Neuville, Points aux Trembles, Portneuf Co., about 22 miles west of Quebec. There are 21 shells in the lot, all bright yellow, with the following band formulas:

Six var. *arenicola*, 12345 transparent, 4 and 5 faint.
Three var. *arenicola*, 12345 transparent, 4 and 5 very faint.
Three var. *arenicola* (?), 12300 transparent.
One var. *arenicola*, 12000 traces of 1.2 near aperture.
One, 00000.
One, 12345, young shell, 4 whorls.
Six immature, 4 to 4½ whorls, all showing translucent bands.
Largest shell 22 x 18 x 16½ mm.
Smallest shell 18½ x 16 x 15 mm.—Geo. H. Clapp.

As a small contribution to the discussion in the Nautilus In re the Southern Range of *Epiphragmophora infumata*. I collected a fine living specimen of the typical form in the "Muir Woods," Mt. Tamilpais, in May, 1909. This is in Marin county, and I believe about twenty miles north of San Francisco.—Geo. H. Clapp.

Vallonia in Chicago.—Eleventh month, eleventh day, 1911. Funny date, funny day! Thermometer standing at 72°, wind at 40 miles per hour. Thought I must do something unusual, so at 9 a. m. took my little tin tobacco box and walked to 63d and Prairie Ave., near where the South Side Elevated goes round the bend, and looked for *Vallonias*. About a month ago I captured 1782 in two hours. To-day I returned in an hour, and must have four or five times as many. It may not be news, but they reminded me of white ants, the way they "bored into" the decaying sticks and wood.

I think this is a "record" for collecting so many near the heart of a great city. If any one wishes samples let him speak out.—E. E. Hand, Wendell Phillips High School, Chicago, Ill.

On the Type of Congeria.—The genus *Congeria* Partsch was proposed for four new species of the Hungarian miocene, *C. subglobosa*, *C. triangularis*, *C. balatonica* and *C. spathulata*. No type was selected, and so far as I can learn none has been expressly selected by any subsequent author. Professor Karl von Zittel, in his well-known Handbuch der Paläontologie, figured *C. subglobosa*, and that only as an example of the genus (Vol. I, p. 43, fig. 56), but by some error, such as may overtake even the most careful naturalists, he wrote the name "*Dreissensia* (*Congeria*) *conglobata* Partsch." This error was perpetuated by Dr. Paul Fischer (Manual de Conchyl., p. 973). The same species is mentioned and figured in the English translation of Zittel's Text-book of Palæontology, I, p. 387, fig. 685 (1896), and here the name under the figures is correctly given, *subglobosa* Partsch. The general use of this species as an example of *Congeria* renders it expedient to select it as type. *Congeria subglobosa* Partsch is therefore the type of *Congeria*.

C. subglobosa is very aberrant for a mytilaceous bivalve, being thick, rounded-quadrate, with somewhat the general contour of the deep valve of *Exogyra*. Dr. Dall, to whose work on Pelecypods we naturally turn for such information, considers our American Dreissenids to belong to *Congeria* rather than to *Dreissena*, the common European genus, which he shows to be generically different (Tertiary Fauna of Florida, p. 808). It must be admitted, however, that the American forms by their shape and thinness differ a good deal from the type of *Congeria*, so that the group *Mytilopsis* Conrad

(Proc. A. N. S., Phila., 1857, p. 167) will probably be retained for them, in a subgeneric sense. Its type and only species was *M. leucophæatus* Conr., of the Atlantic coast north to Chesapeake Bay.

Partsch's article appeared in a very rare periodical, and is entitled "Ueber die sogenannten versteinerten Ziegenklauen aus dem Plattensee in Ungarn mit ein neues urweltliches Geschlecht zweischaliger Conchylien," von Paul Partsch, published in Annalen des Wiener Museums der Naturgeschichte, I, pp. 93–102, 1835. *Congeria* is first mentioned and defined on p. 97 (not p. 93, as has been cited).—H. A. Pilsbry.

The Name Glossina.—It is a curious illustration of the wide separation of different groups of zoologists that the name *Glossina* has been permitted to remain in use for a Brachiopod, apparently without protest, while it rightfully belongs to the well-known tse-tse fly, the carrier of the sleeping sickness organism. This double use, contrary to the rules of nomenclature, is perhaps still more objectionable since we discovered the Dipterous *Glossina* in the miocene of Colorado, and the name consequently enters palæontology. Probably those who may have noticed the conflict have found that the nomenclators give no date for *Glossina* Wiedemann, and consequently no certain indication of its priority. It was published, however, in 1830, while the Lingulid *Glossina* Phil. (type *Lingula attenuata* Sowerby) did not appear until 1848. The Lingulid genus or subgenus (Dr. Charles Schuchert writes me that "at present the name cannot have greater value than that of subgeneric rank") may take the name *Palæoglossa*.—T. D. A. Cockerell.

Helix Hortensis on Long Island, N. Y.—Smith and Prime, in their list of Long Island mollusks, 1870, p. 404, reported *H. hortensis* from Long Island, without citing any definite locality. The undersigned will be grateful for any further information. Where on Long Island, or elsewhere in New York, has the species been found, and in what collections are specimens preserved? Similar information on the occurrence in New York of *Polygyra inflecta* Say, *P. appressa* Say and *P. multilineata* Say is desired.—*H. A. Pilsbry*, Acad. Nat. Sciences, Logan Square, Philadelphia.

ARKANSIA WHEELERI, N. SP.

THE NAUTILUS.

VOL. XXV. JANUARY, 1912. No. 9

A NEW NORTH AMERICAN NAIAD.

BY DR. A. E. ORTMANN AND BRYANT WALKER.

ARKANSIA, n. g.

Shell moderately thick, subrotund to subovate or subrhomboidal, inflated, with full beaks. Disk sculptured with irregular, oblique folds, which are sometimes indistinct. Beak sculpture poorly developed, consisting of two to three double-looped bars, the loops slightly swollen or tubercular, disappearing toward the disk and not continuous with the sculpture of the latter. Hinge well developed, with strong pseudocardinals, a very strong interdental projection in the left valve and well developed, strong, but rather short laterals.

Soft parts: Supra-anal opening separated from the anal by a mantle connection, which is somewhat variable, but rather long (a little shorter to somewhat longer than the anal; the supra-anal is correspondingly longer or shorter; in one case there is a double mantle connection). Mantle edges, between the anal and branchial, drawn together by the gill-diaphragm but not united. Inner edge of anal almost smooth, that of the branchial with papillae.

Outer lamina of outer gills connected with mantle to its posterior end, and thus the gill-diaphragm is complete. Anterior end of inner gills located about midway between the posterior base of the palpi and the anterior end of the outer gills. Inner lamina of inner gills free from the abdominal sac, except for a short distance at the anterior end. Palpi of medium size, subfalcate, their posterior margins connected for about one-third of their length.

Gills with well-developed septa and water-tubes. The septa are rather distant in the male and in the inner gill of the female. The outer gill alone is marsupial in the female, with very close septa. Edge of marsupium with slightly thickened tissue, indicating that it is capable of being stretched out when gravid.

Type: *Arkansia wheeleri* Ortmann and Walker.

ARKANSIA WHEELERI, n. sp. Pl. VIII.

Male and female shells alike. Shell subrotund to subovate or subrhomboidal, inflated, rather thick and solid; dark reddish-brown or black, usually lighter toward the beaks, which in young shells are chestnut-colored; epidermis with a silky luster; beaks very prominent, projecting anteriorly and incurved over the large lunule, their sculpture consisting of two or three double-looped bars, the loops slightly swollen or tubercular; sculpture restricted to the extremity of the beaks, the remainder of the umbonal region being entirely smooth; posterior half of the disk sculptured with irregular, oblique folds, sometimes nearly obsolete, which on the dorsal slope curve upwards, and in front of the posterior ridge are crossed by numerous, irregular, radiating, small folds or wrinkles at right angles to the lines of growth; anterior portion of the disk smooth; anterior margin nearly straight in front of the beaks, then projecting in a regular curve, which continues around the basal margin until it meets the posterior margin at an obtuse angle about one-third up from the base; hinge margin nearly straight; posterior margin slightly curved; posterior ridge not prominent, usually rounded, but sometimes obscurely biangulate; hinge complete; pseudocardinals strong, ragged, in the left valve, two, not strongly differentiated and coalescing along the hinge line, the anterior narrow and parallel with the hinge line, the posterior somewhat wider and heavier and scarcely separated from a strong projection of the interdentum, which is continuous with the lower lateral and slopes gradually to its extremity; upper lateral low, the groove between them deep and extending nearly to the beak; a single, strong pseudocardinal in the right valve with a deep pit behind it to receive the anterior pseudocardinal of the left valve, interdentum cut away to make room for the interdental projection in the left valve; a single strong, but rather short lateral; ligament dark brown; muscle scars not very deep, those of the anterior adductor and posterior adductor large,

those of the anterior retractor and pedal protractor rather small and inconspicuous; cavity of the beaks very deep; nacre usually salmon-colored above the pallial line, bluish-white below (sometimes entirely white) and rather thin, slightly iridescent with a wide, dark prismatic border.

Length (of type) 73.5, height 62, diam. 41 mm.

Types (No. 33754, coll. Walker), from the Old River, Arkadelphia, Arkansas. Co-types in the collections of the Carnegie Museum, the Phil. Acad. of Science, the U. S. Nat. Museum, and Rev. H. E. Wheeler.

The shell characters of this fine species and most interesting addition to our fauna are very peculiar and can be compared only with *Arcidens*, to which genus, *Arkansia*, undoubtedly, is the closest affinity. In general, the external appearance is quite similar, and in both the smaller series of radiating wrinkles and the curved folds of the dorsal slope are very much alike. But *Arkansia* is a much heavier and more inflated shell, with the beaks fuller, more projecting and more anterior, and the strong, oblique folds, like those of *Quadrula plicata*, are peculiarly its own. It differs, also, entirely in the beak sculpture, which is comparatively simple and confined to the extremity of the beak, and is quite similar to that of certain *Quadrulæ*. In hinge characters it differs in having strong, well-developed laterals. In the presence of the interdental process in the left valve and the cutting away of the interdentum in the right valve opposite it, it is related to both *Arcidens* and *Symphynota*.

The smallest specimen examined (in Mr. Wheeler's collection), measures length, 35; heighth, 33, and diam. 23 mm., being almost circular in shape, and looks, externally, very like a young, smooth *Q. pustulosa* Lea, the oblique folds being only slightly evident in the post-basal region.

A very large specimen, also in Mr. Wheeler's collection, measures length, 87; height, 73, and diam. 48 mm.

The structure of the soft parts agrees entirely with that of the subfamily *Anodontinae*, chiefly so the mantle edge and the outer marsupial gill. Unfortunately only sterile females have, as yet, been obtained, but it is hoped and expected that this deficiency will soon be remedied.

We take great pleasure in naming this most interesting addition to our fauna after its discoverer, the Rev. H. E. Wheeler of Arka-

delphia, Ark., who is actively engaged in developing the fauna of Arkansas. The generic name is an abbreviation of the name of its native state.

THE ANATOMY OF THE NAJAD HYRIDELLA AUSTRALIS (LAMARCK) (= DIPLODON AUSTRALIS).

BY A. E. ORTMANN.

Through the courtesy of Mr. L. S. Frierson, I have received the soft parts of a male and a female of an Australian Najad, *Diplodon* (*Hyridella*) *australis* (Lamarck) (see Simpson, Pr. U. S. Mus. 22, 1900, p. 890). Mr. Frierson obtained these specimens from Mr. William T. Bednall, who collected them in Gippsland, Victoria. I also received a shell which agrees well with specimens of this species represented in the Carnegie Museum collections. An examination of the soft parts revealed the following characters:

Anal opening (a) closed above by the connection of the inner mantle edges, without forming a supraanal opening. Closed part about four times as long as the anal opening, *forming a rather broad membrane between the outer mantle edges, and around the anal.* The latter is short, subcircular or slightly subelliptic, and *much shorter than the branchial opening* (only about one-fourth as long). It is separated from the branchial opening by the solid union of the inner mantle edges (m). Inner edge of anal practically smooth, that of the *branchial* (b) with distinct papillae, which stop suddenly in front, thus defining sharply the anterior end of this opening. There is no sign of a coalescence of the two mantle halves at this point. Farther in front, the inner mantle edge is smooth, and becomes indistinct anteriorly.

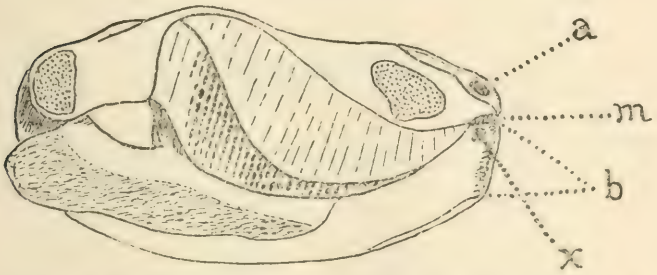
Palpi subtriangular, about as long as wide, with the posterior point not produced. *Posterior margins connected about half their length.*

Gills rather long and wide, the inner the wider, chiefly so anteriorly. Edge of inner gill with a longitudinal furrow, which is absent in the outer gill. Outer gill gradually narrower anteriorly, with its anterior end situated at the highest part of the mantle-attachment-line. Inner gill very slightly narrower anteriorly, with a broad anterior insertion occupying the whole space between the

anterior end of the outer gill and the posterior base of the palpi. However, this gill is not actually connected with the palpi, but its anterior end begins immediately behind the posterior end of the palpi.

Outer lamina of outer gills entirely connected with the mantle; inner lamina of inner gill entirely connected with abdominal sac. Posteriorly to the foot, the two inner laminae of the inner gills are entirely connected, thus forming a diaphragm completely separating the suprabranchial canals from the branchial cavity. This gill-

FIGURE 1.



Anatomy of *Hyridella australis* (Lamark) (female). Side view of soft parts after removal of left half of mantle. *a*, anal opening; *b*, branchial opening; *m*, solid mantle connection between anal and branchial opening; *x*, hole by which the cloacal and branchial chambers communicate.

diaphragm does not extend entirely to the posterior margin of the mantle, and the posterior part of the diaphragm is formed by the bridge (m) which unites the two mantle margins and separates the anal from the branchial opening. *But there is a small median hole* (x) *between the posterior end of the gills and this bridge, connecting the cloacal cavity (and anal opening) with the branchial cavity.*

In all four gills of the male the two laminae are connected by very faint, distant, and often incomplete and interrupted septa, running in the direction of the gill-filaments. The outer gill of the female, and the most anterior and most posterior parts of the inner gill have the same structure; the rest of the inner gill of the female (its larger middle part) has marsupial structure (see figure), with strongly developed interlamellar connections. In the sterile female at hand, the solid parts are slightly elongated in the direction of the

gill-filaments, and stand in rows, forming interrupted septa and incomplete, intercommunicating water-tubes. Toward the base of the gill the interruptions are short and the interlamellar connections stand close together, resembling almost continuous septa. Toward the edge of the gill the interlamellar connections are more distant, showing a tendency to fall into transverse rows, but these are rather irregular, and in some places an almost reticulate appearance is presented.

The female examined is sterile, and thus nothing can be said about the eggs and glochidia. A slide, belonging to the same species, and kindly communicated by Mr. Frierson, shows vertical cross sections through the inner gill of a female, containing eggs, but no glochidia.

The rest of the soft parts offers nothing remarkable. The foot has a sooty-black color in its distal parts, sharply marked off from the whitish basal parts.

It is evident that this structure agrees to a remarkable degree with that of the South American genus *Hyria*, described previously (Nautilus, 24, Jan. and Febr., 1911, pp. 108 and 114): In fact, practically all the essential features are identical. The South American genera *Diplodon*, *Castalina*, and *Tetraplodon* possess the same anatomy, except that in some of them we observe a tendency to form a mantle-connection in front of the brachial opening.

The only differences I am able to discover in the Australian form are: 1. The anal opening is much shorter and approaches more a circular outline, and, at the same time, the united mantle edges form a much broader membrane between the outer edges, and are broader around the anal, so that is is probable that the anal of the Australian species was capable of being stretched out as a tubular "siphon," much more pronounced than in the South American forms; 2. An unusual feature is the hole by which the cloacal cavity communicates with the branchial under the bridge, which separates anal and branchial openings. This hole is clearly seen in both of my specimens, and does not look like an accidental or abnormal condition. I have not seen anything like it in any South American form.

The connection of the posterior margins of the palpi probably is of no consequence; there is great variability in this feature in other groups.

It seems to me that the above differences are important. Of

course their existence in other Australian species should be confirmed. For the present, I think, it is well to separate the Australian form generically from the South American *Diplodon*, or, in other words, we should give to the subgenus *Hyridella* Swainson, 1840, generic rank. This is supported by the fact that *Hyridella* also differs in certain shell characters from the typical *Diplodon*, as has been recognized already by Simpson (l. c. p. 888).

One very important conclusion, however, is now finally established: Simpson's opinion that the Najades of the type of *Diplodon* (*Hyridella*) *australis* are closely related to certain South American forms (typical *Diplodon*), *is fully justified, and there remains not the slightest doubt about this.* The structure of the soft parts of both groups is so similar and so greatly different from the true *Unionidae* of the rest of the world, that *Hyridella*, no matter whether we regard it as a genus or a subgenus, must be placed with the family *Mutelidae* (?) and the subfamily *Hyriinae* (see NAUTILUS 24, March, 1911, pp. 129, 130). *This affinity is of the utmost zoögeographical importance.*

MUSCULIUM DECLIVE, N. SP.

BY V. STERKI.

Mussel rather small, subequipartite, slightly to moderately inflated; beaks not or little anterior, somewhat prominent over the valve margin; the latter, anteriorly and posteriorly, straight or slightly curved, forming the two shanks of a rounded angle between the beaks, of about 130°, the posterior incline placed higher up than the anterior; balance of the outlines rounded without any angles in full-grown specimens; in half-grown and adolescent there is a short truncation at the posterior margin, at right angles to the longitudinal axis, and a similar one at the anterior, somewhat oblique; in young —post-nepionic—specimens, the posterior part of the mussel is shorter and higher than the anterior; surface glossy to waxy, with very fine (microscopic), sharp, crowded, concentric striæ, and usually one or two lines of growth, and faint, irregular radial markings; shell thin, transparent to translucent; color light amber, to somewhat grayish or brownish in old specimens; hinge rather long;

left posterior cardinal tooth rather long, curved, the anterior small, sharply pointed, strongly curved upward, corresponding with an excavation below the right cardinal; laminæ ["laterals"] comparatively stout, the anterior of the left valve markedly projecting inward; ligament rather long; long. 7, alt. 6, diam. 4 mill.; soft parts not examined; Justice Latchford writes that the mussel "is of a bright chrome yellow when fresh, and seems to be unlike any other."

Distribution: Blue Lake, Muskegon Co., Michigan, collected and sent by Dr. R. J. Kirkland in 1899—the type lot, No. 1697 of my collection of *Sphæriidæ;* Pine Lake, Marquette Co., Mich., collected by Mr. Bryant Walker in 1902; Gorman Lake, Renfrew Co., Ont., collected by H. Justice F. R. Latchford in 1911. From the two last named places the specimens are considerably smaller, slighter, and little inflated, the nepionic shell is smaller, and in some specimens barely or not marked off (æstivale form).

This is a clearly distinct and well-marked species, apparently ranging nearest *M. rosaceum* Pme. It should be looked for at other places, and especially fossil, in marl deposits, etc.

COLLECTING FROM HADDOCK ON THE GEORGE'S BANKS.

BY W. F. CLAPP.

Many malacological students believe that shells taken from fish stomachs have no practical locality. It has been argued that it would be an easy matter for a haddock to change it's position 150 miles in 24 hours. It is possible that a fish may retain its food that length of time. Therefore a shell, found in a haddock caught near Cape Cod, may have been in Nova Scotia waters the day before. This of course would apply only to those shells which had passed through a considerable portion of the intestines, for one is sure of the habitat of a shell in proportion to the distance it has traversed the digestive tract. I believe that Gould and other authors who have described shells found in fish, intend the word stomach to include the entire alimentary canal. Less than 5 per cent. of the shells I have found in fish came from the stomach proper.

My object in writing this note is merely to show plausible reason for placing more confidence in fish-stomach localities. Under certain conditions I believe them to be fairly accurate.

On November 20, 1911, I examined the contents of nearly 1000 fish caught in "Cove Clark," Georges Bank, lat. 41.18 N., long. 68.40 W., in 60 fathoms. This locality is known to fishermen as a "spaghetti" spot, on account of the great masses of worm tubes found on the muddy bottom. These worn tubes accumulate in such quantities that it is almost impossible to use a beam trawl successfully. I obtained several hundred specimens of Yoldia, Nucula and Leda from haddock, also quantities of the worm tubes, but no gasteropods. The dredge produced the same results with the addition of *Cyrtodaria siliqua* Daudin and *Panomya norvegica* Spengl. to the Molluscan fauna of this spot. It contained even a greater proportion of the worm tubes. The similarity of the mass of animal life and mud obtained from the fish stomachs to that obtained from the dredge was very noticeable.

On November 21 the position of the vessel was changed to a station about ten miles to the eastward. The depth here was about 40 fathoms, the bottom coarse gravel and there were no worm tubes. The first haddock I examined from this new locality contained about 50 shells, nearly all of which were gasteropods. I examined over 500 haddock during the day and at dark had filled a ten-quart pail with Mollusca.

The dredge was set six times during the day and the contents compared in a surprising degree to the contents of the fish stomachs, not only in Mollusca but in other phyla. Not one specimen of Yoldia, Nucula or Leda could I find in either the dredge or the fish, and yet ten miles to the eastward I had obtained plenty of all three, from the haddock stomachs and from the dredge.

There is nothing definite in these observations. I do not insinuate that all haddock-stomach localities would be as accurate as these appear to be. It is only by recording an observation of this kind that we can ever hope to arrive at definite knowledge on the subject. I merely suggest the possibility that fish-stomach localities are more accurate than most of us have generally supposed.

The following species were removed from haddock November 20 and 21, Lat. 41.18, Long. 68.40 W.

Puncturella noachina Linn.
Margarita cinerea Couth.
Solariella obscura Couth.
Scala groenlandica Perry.
Amauropsis helicoides Johnston.
Polinices heros Say.
triseriata Say.
immaculata Tott.
nana Moll.
Natica clausa Brod. & Sowb.
Marsenina glabra Couth.
Trichotropis borealis B. & S.
Crepidula plana Say.
Mesalia erosa Couth.
Aporrhais occidentalis Beck.
Couthouyella striatula Moll.
Nassa trivittata Say.
Chrysodomus decemcostatus Say.
Sipho stimpsoni Morch.
pygmaeus Gould.
Buccinum undatum Linn.
Admete couthouyi Jay.
Bela incisula Verr.
cancellata M. & A.
gouldii, Verr.
pleurotomaria Couth.
nobilis Moll.
harpularia Couth.
decussata Couth.
bicarinata Couth.
bicarinata, var. violacea M. & A.
rosea Sars.
concinnula Verr.
Cylichna alba Brown.
Retusa gouldii Couth.
Philine quadrata S. Wood.
lima Brown.
Dentalium entalis Linn.
Nucula tenuis Montg.
proxima Say.
Leda tenuisulcata Couth.
Yoldia limatula Say.
sapotilla Gould.
Solemya velum Say.
borealis Tott.
Anomia simplex d'Orb.
Mytilus edulis Linn.
Modiolus modiolus Linn.
Modiolaria corrugata Stimp.
Crenella glandula Tott.
decussata Montg.
Pecten islandicus Muller.
magellanicus Gmel.
Venericardia borealis Conrad.
novanglii Morse.
Astarte castanea Say.
quadrans Gould.
subaequilatera Sowb.
Cyclas islandica Linn.
Thyasira gouldii Philippi.
Macoma calcarea Gmelin.
Spisula solidissima D'llwyn.
Cardium pinnulatum Conrad.
ciliatum Fabr.
Siliqua costata Say.
Saxicava arctica Linn.
Cyrtodaria siliqua Daud.
Thracia truncata M. & A.

For a more definite knowledge of the fauna of the "Georges' one should consult the excellent paper by S. I. Smith and O. Harger, "Report on the dredgings in the region of St. George's Banks" (Trans. Conn. Acad., III, pp. 1–57, 1876).

LYMNÆIDÆ OF AROOSTOOK COUNTY, MAINE.

BY OLOF O. NYLANDER.

In recording some additional notes on the Lymnæidæ of Aroostook County, I have followed Mr. Frank Baker's valuable work on the Lymnæidæ of North and Middle America. *Galba umbilicata* is the *Limnæa humilis* and *G. obrussa* the *L. desidiosa* of my previous lists.

Galba umbilicata C. B. Adams. Fine specimens of this species were common in damp places and ditches along the roads in Caribou and surrounding towns.

Galba obrussa Say. This variable shell is common in the Aroostook River. The following varieties are most prevalent:

Galba obrussa peninsulæ Walker. Specimens were collected in the southeastern part of the town of Castle Hill, in wet places along the road.

Galba obrussa exigua Lea. Common on rocks at low water in Aroostook River. Many colonies were found in Caribou stream, and some are exceedingly variable, hardly two specimens being exactly alike.

Galba obrussa decampi Streng. A common fossil in the marl deposits of Aroostook County. Living specimens were found in a small brook, tributary to the south branch of Caribou stream in Woodland and in Salmon brook.

Galba emarginata Say. Many colonies were found in Fish River.

Galba emarginata mighelsi W. G. Binney. Square Lake, Cross Lake, Eagle Lake and Portage Lake, all on the Fish River. The specimens from Square Lake are typical of this variety, and are the largest and finest specimens known.

Galba oronensis Baker. A large colony of this species was found in Caribou village where the Caribou stream enters the Aroostook River. The specimens were found on rocks at low water. The color of the animal is bluish-black or mouse color.

The Caribou stream is full of rubbish from the starch factories, saw-mills and grist mills, and the refuse of the village which furnishes the *G. oronensis* with abundance of food. There is one potato-starch factory about three hundred feet from the shells, and sometimes the colony is nearly covered with the refuse from this

place. I have examined the river for many miles, but have never found any of the shells elsewhere.

NOTES ON PHYSA GYRINA.

BY A. A. HINKLEY.

A small spring, the basin of which has been dug to the depth of three feet or more and walled with rock to the surface of the ground, has been the home of *Physa gyrina* for many years. The water spreads out some as it leaves the basin and then drains into a ditch nearby.

Until this year, this colony has been nearly typical of the species. On April 28th I noticed that there was quite a number of good-sized shells around the borders of the basin, and on examining them was surprised to find an unusual roughened or malleated surface amounting to folds and humps on some individuals. The roughened surface was confined to the last stage of growth, which rarely extended back much over half the whorl. On this date egg-masses were numerous on and under leaves, which were in the shallow water. All mature shells I could find were taken for my cabinet.

On May 8th a few more mature shells were found, at this time most of the eggs had hatched and the minute shells were very numerous.

November 26th a visit to the spring in the morning surprised a pair of kildee plovers feeding in the shallow water, no *Physa* were visible around the borders, a few were found under leaves, but the shells could be seen on the bottom of the basin, and where the water issues from the rock they were piled up several deep.

Afternoon I returned with a net and took some fifty of the largest, most of these have two callus deposits or bands, and a few three; these bands are not the same on any two shells, they may be close together or half a whorl apart, the last one may be the borders of the outer lip or as far as one-fourth of a whorl back. The lines of growth may be a little stronger than usual, but none of these shells show the roughened surface of those taken seven months ago. It will be interesting to see what develops by the time the year is past.

The Nautilus.

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NOTES ON THE VARIATION OF STROMBUS PUGILIS.

BY CHARLES W. JOHNSON.

A large series of *Strombus pugilis* Linné, with its varieties *alatus* Gmel. and *nicaraguensis* Fluck, together with its Pacific analogue, *S. gracilior* Sowb., and their Oligocene precursors, *S. proximus* Sowb. and *S. pugiloides* Guppy, form a very interesting group for studying the evolution and variation of a species.

Young specimens (lacking the body whorl) differ even more in general appearance than the adults. The apices of most specimens are usually wanting, but a young example of the typical form and one of the variety *alatus*, in the collection of the Boston Society of Natural History, show the following differences: In *pugilis* the *first* two whorls are entirely smooth; the *third* with obsolete longitudinal ribs; the *fourth*, *fifth* and *sixth* with prominent ribs and two or three varices to each whorl, but without spiral lines; *seventh* with ribs, spirals and varices; *eighth* nodulose, with a varix and prominent spirals; *ninth* nodulose, with prominent spirals; *tenth* with coarse spirals and fine intermediate lines; the row of nodules are almost covered by the following whorl; the *eleventh* (preceding the body whorl) has long spines at the periphery, a few spirals below the suture and at the anterior half, the remainder of the whorl being smooth; length of specimen 42 mm.

In the specimen of *alatus* the protoconch is broken, but a part of the third whorl would indicate two smooth whorls, as in *pugilis;* the

fourth whorl has some obsolete longitudinal ribs and spiral lines at the base; the *fifth*, *sixth* and *seventh* have prominent longitudinal ribs and spirals, without varices; *eighth* with similar sculpture and one varix; on the *ninth* the ribs and spirals form slight nodules at the shoulder, with one varix; *tenth* subnodose with coarse spirals; *eleventh* subnodose with coarse spiral ridges and fine intermediate lines covering the entire whorl. Length 49 mm.

Though larger, it is apparently the same age as the specimen of the typical form. Whether the above characters will prove to be constant I cannot say. The typical form seems to assume the larger spines of the adult one whorl in advance of the variety *alatus*. The variety *nicaraguensis* is smaller than either *pugilis* or *alatus*, and the spiral ridges usually cover the entire body whorl of the adult shells. *S. gracilior* loses its spirals much earlier than *S. pugilis*.

In the adults there are some marked variations both in color and form. The typical *pugilis* is less variable in color, ranging from an orange-yellow to carnelian-red; *alatus* varies from white to purple, and from a purplish brown to deep orange or carnelian-red. Externally *pugilis* is usually a uniform yellowish brown, while *alatus* varies from a light yellow to a dark brown, the latter color often disposed in bands or zigzag markings; *nicaraguensis* is of a uniform dark salmon color.

The length and shape of the spines vary in both forms. A figure in Chemnitz (Conch. Cabinet, X, tab. 196, f. 1493), shows the rows of spines at the periphery; the two united would give the broad, vertically compressed spines as figured by Chenu (Manuel Conch., I, p. 225, fig. 1582). In the many specimens which I have examined I have never seen these forms; they probably represent unique abnormal specimens. Tryon is wrong in making the *non-spinose* form of *alatus* typical. The figure referred to by Gmelin (Conch. Cabinet, III, tab. 91, f. 894) is the common brown form of Florida, with a row of subacute tubercles on the body whorl. Lamarck, under *S. pyrulatus*, refers to the same figure. Specimens of *alatus*, in which the tuberculate spines are entirely wanting, are not common, only about five or ten per cent. I found the greatest number at Marco, Florida. A spineless form of *pugilis* has also been recorded. A specimen in the Boston Society's collection has the spines wanting in the greater portion of the body whorl, as figured by Knorr, III, tab. 16, fig. 1.

LAND MOLLUSKS OF GARRETT COUNTY, MARYLAND.

BY WITMER STONE.

While the writer is not a conchologist, he has for a good many years been picking up such land snails as came in his way in the course of field work in other branches, and submitting them to Dr. Pilsbry for the collection at the Academy of Natural Sciences, at Philadelphia. With an experience limited mainly to the eastern half of Pennsylvania and southern New Jersey, where snail shells are conspicuous by their scarcity and small size, his enthusiasm for conchology did not rise to a very high pitch, and it is therefore not surprising that his first experience in a region where land snails really did thrive and multiply impressed him not a little.

The first visit to Garrett county, Maryland, was made in June, 1907, in company with Messrs. Bayard Long and Thomas D. Keim. We stopped at the little lumber village of Jennings, as the guests of Mr. Herman Behr, who was in charge of the timber operations, and who gave us every possible assistance in carrying on zoölogical and botanical collecting, and whose personal knowledge of the country and its flora and fauna was invaluable.

Jennings is located near the head of the Castleman River, a branch of the Youghiogheny, which flows down into Somerset county, Pa., directly north, and is bounded on the east by Meadow Mountain and the west by Negro Mountain, 2000 to 3000 feet elevation, the former being the watershed between the Potomac and Ohio drainage. Castleman River is lined for a good part of its course with rocky woodland of hemlock, sugar maple, beech, birch, oak, etc., much more varied in character and with a larger percentage of hard wood than the primeval forests of the central Pennsylvania mountains. These woods are often dark and damp with quantities of loose stones and rocks forming their floor, partly covered by moss and low herbs, but with numerous miniature caves and passages extending down among them, and old moss covered tree-trunks here and there in all stages of decay. During the two days of our stay there was an almost constant drizzling rain, which, however unpleasant it might have been for collectors, was ideal weather for snails. They simply swarmed on old stumps, logs, rocks, and even on the stems and leaves of herbs and low shrubs. A modest tin box brought along

for the accommodation of casual snails and other lower forms of life was soon filled to the brim, then a couple of handkerchiefs knotted into loose bags accommodated a quart or so, until it became evident that the size of the catch was only a question of the time at our disposal, and attention was directed to other fields.

A second trip of a week's duration was made to Jennings in August, 1911. The weather was clear, and this fact, together with the heat of midsummer, drove the snails into subterranean retreats, so that they did not seem so numerous, although a good series was obtained and more attention directed to the smaller species, yielded a number of forms not secured in the first trip.

Vitrea carolinensis, a species of the southern Alleghenies, was obtained at Jennings, extending its known range very materially to the northward; also *Mesomphyx laevigata monticola*, a southern Alleghenian shell already known from a little farther north in Pennsylvania. *Vitrea ferrea*, of boreal distribution, not known south of the Pocono Mountain in Pennsylvania and Ohio, so far as I am aware, was also secured.

While these species are interesting to a student of geographic distribution and coincided nicely with similar cases of range among the birds and plants, the big Polygyras were what really appealed to me.

In eastern Pennsylvania *P. thyroides* is the only land shell of any size that is generally distributed, though favorable localities yield moderate-sized *P. albolabris*, and towards the mountains we come upon an occasional *Omphalina cuprea*. But here at Jennings we had an abundance of good, big *P. albolabris*, as well as of *P. profunda*, *P. zaleta* and *P. dentifera*, and now and then the northern *P. sayana* and *P. palliata*, together with a dozen species of medium size, only four of which are found in eastern Pennsylvania.

My first collection was placed in a wooden cigar-box in order to keep them alive, and next morning I had the pleasure of seeing them festooning the bureau and looking-glass in my bed-room, long, slimy trails marking their line of escape. The combined strength of the big fellows had been enough to topple the weight off the lid and so enable them to force their way out.

I am greatly indebted to Dr. Henry A. Pilsbry and Mr. E. G. Vanatta for identifying my material, all of which is now in the collection of the Academy. A list of the species follows, as it seems important in view of the rapid deforestation of this country, to pre-

serve records of the relative abundance of all forms of life where primeval conditions still remain:

Polygyra tridentata Say. Common.

Polygyra fraudulenta Pilsbry. Frequent.

Polygyra profunda Say. Common.

Polygyra sayana Pilsbry. Three examples.

Polygyra albolabris Say. Common, but no specimen of variety *dentata*.

Polygyra zaleta Binney. Common.

Polygyra dentifera Say. Common.

Polygyra palliata Say. Frequent.

Polygyra monodon fraterna Say. Frequent.

The Polygyras were most abundant in damp, dark woodland. Curiously enough, I found not a single specimen of *P. thyroides* or *P. hirsuta*. The former has been taken by Mr. S. Brown at Laurel Ridge, Somerset county, Pa., and the latter at Ohio Pyle, Fayette county, Pa. Possibly they do not push so far back into the mountains as the other species.

Bifidaria corticaria Say. Eight specimens.[1]

Bifidaria contracta Say. Two specimens.

Vertigo gouldii Binney. Eighteen specimens.

Circinaria cancava Say. Common.

Omphalina cuprea Raf. Common.

Mesomphyx inornata Say. Common; most frequent on dead leaves on the floor of the forest.

Mesomphyx laevigata monticola Pilsbry. Three examples.

Vitrea indentata Say. Twelve specimens.

Vitrea carolinensis Cockll. One specimen.

Vitrea multidentata Binn. Two specimens.

Vitrea ferrea Mse. Four specimens.

Vitrea milium Mse. Two specimens.

Zonitoides arborea Say. Common.

Gastrodonta intertexta Binney. Several.

Gastrodonta ligera Say. Frequent. This and the preceding seemed to be most abundant in open sugar-maple groves.

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[1] Mr. Vanatta kindly sifted a quantity of dirt and leaves, collected for *Pupidae*, etc., and the actual number of specimens of these minute species obtained from it are given as a possible indication of their abundance.

Philomycus carolinensis Bosc. Common.
Pyramidula alternata Say. Common, especially on tree-trunks.
Pyramidula perspectiva Say. Common on fallen logs.
Helicodiscus parallelus Say. Two specimens.
Carychium exile Lea. Three specimens.

OPEAS GRACILE (HUTTON) IN THE UNITED STATES.

BY HERBERT H. SMITH.

During a hurried collecting excursion in the outskirts of Mobile (low land near the river) I found a single specimen of *Opeas gracile.* The Museum of the Geological Survey of Alabama has three lots of this species, all collected near Mobile, respectively by Dr. E. R. Showalter, Dr. Charles Mohr and Mr. H. P. Löding. It appears to be rather common, at least in the immediate vicinity of the city. Dr. Pilsbry's list of localities (Man. Conch., XVIII, pp. 198, 199) shows that it is found all around the Caribbean Sea, on both sides of Cuba and Santo Domingo and on the Gulf coast of Mexico. Whether or not it is indigenous on the Alabama coast remains to be seen. It is a shore species, hardly ever found more than a mile or two from the sea, and it might easily be transported on timber which has lain on the beach, or in ballast. On the other hand, it should be remembered that we know very little of the land-snails living on or near our Gulf coasts. The question of a recent or older introduction of this species can only be settled when we have studied the Alabama coast region thoroughly ; if it is a recent introduction, its range must be limited to the immediate vicinity of Mobile and perhaps the upper bay ; if it is older it will, no doubt, be found on the low lands of Baldwin county, and in Florida.

Not feeling quite sure of my determination, I sent specimens of the shell to Mr. Bryant Walker. In a recent letter he says: "It is *Opeas gracile* Hutt. as you suspected. There are no published U. S. records that I know of, but last spring, when I was in Charleston, S. C., Mr. W. G. Mazyck gave me some that he had collected there and said it was very abundant in that one locality." In this case it seems very probable that the species has been introduced by commerce.

Museum of the Geological Survey of Alabama, Sept 5, 1911.

NOTE.—Under the synonymous name *Stenogyra subula* Pfr. this species was reported from Mobile by W. G. Binney, Manual of American Land Shells, p. 426, noted in Man. Conch., vol. 18, p. 199.

O. gracile was taken by Mr. C. T. Simpson and myself on Key West in 1907. It is particularly abundant in the cemetery. It was not found by us on the other Keys, and did not turn up in the copious collections made by Mr. Moore in the Ten Thousand Islands. It seems likely, therefore, that the species was introduced by commerce at Key West and Mobile. Binney also speaks of it as "introduced."—ED.

DRIFT SHELLS FROM TEXAS.

BY V. STERKI.

Mr. Bryant Walker has kindly sent me a portion—about half a pint—of fine drift siftings, gathered from the Paluxy Creek, at Glenrose, Somervell Co., Texas, southwest of Fort Worth. It contained a large number of mollusk shells, of various groups, many of which are interesting with respect to distribution, or systematics, or both, as the list will show.

Zonitoides arboreus (Say), a few, juv. and immature.

Z. minusculus (Binn.), numerous and variable; mainly two forms: one with the whorls narrow and the umbilicus very wide, especially by the last whorl receding outward towards the aperture, and even ascending above on the penultimate; the other with the whorls wider and the umbilicus narrower. Beside these, there are a few specimens very small, with narrow whorls.

Z. lævisculus (St.), numerous, but few specimens full-sized.

Z. singleyanus (Pils.), var., numerous, somewhat variable.

Z. nummus (Van.), about 40.

Z. milium (Mse.), about 30.

Vitrea indentata (Say), a few dozen, juv. and half-grown.

V. dalliana roemeri (Pilsbry), about a dozen.

Helicodiscus lineatus (Say), a few.

Punctum pygmæum (Drap.), about 150.

Strobilops affinis (Pils. or near), mostly juv. and adolescent, few mature.

Bulimulus dealbatus mooreanus (W. G. Binn.?), a few juv.

Polygyra, a few juv.

Pupoides marginata (Say), about 30 or more, juv.; generally small (larger specimens probably retained on the sieve).

Bifidaria corticaria (Say), two.

B. tappaniana (Ad.), numerous; part are quite small and low (f. *curta*).

B. pentodon (Say), numerous and somewhat variable; generally small.

B. pentodon floridana (Dall), a few and intermediate forms.

B. holzingeri (St.), one.

B. procera (Gld.), about 60.

B. duplicata (St.), new, abundant; somewhat variable as to size; brown to light horn to colorless (albino).

This *Bifidaria* has been known for many years, but was not published. It is much like *B. procera cristata* Pils., averaging slightly smaller, but differs mainly by its parieto-angular lamella, being always long and complex, while that of *cristata* is shorter and apparently simple, and it ranges nearer *procera* than *cristata* does. The latter is known from New Mexico and Arizona, *duplicata* from New Mexico to Texas (southwest, south and north) to Kansas. Among the present material not one specimen was seen which even approached *cristata*. More details in regard to the relations of these and other *Bifidariæ* of the group will be given elsewhere.

B. hordeacella (Pils.), abundant; mostly of the typical form, but somewhat variable; some specimens quite small with fewer whorls; a few are albinos. One specimen is reversed (sinistrorse).

B. contracta (Say), abundant, with little variation.

B. armifera (Say), a few juv. only.

Vertigo milium (Gld.), 2.

V. rugosula (St.), one; known from Florida to southern Texas.

Carychium exiguum (Say), about 20.

C. exile (Lea).

Lymnæa (*Galba*) *parva* (Lea?), a few.

Lymnæa (Sp.), one, juv., very small.

Planorbis parvus (Say), a few dozen.

P. carus Pils & Ferr. (?), 2 juv.; somewhat like *parvus*, but smaller

and more depressed [not *umbilicatellus* Ckll.]. These are fresh, while all *parvus* are chalky.

P. bicarinatus (Say), one juv.

Physa, a few juv., very small, apparently of a small and slender form.

Helicina, probably *orbiculata* (Say), juv. only. Two opercula of an *Amnicolid.*

Paludestrina diaboli (Pilsbry).

Pisidium limatulum (St.), one, immature; known from Alabama and Mississippi.

P. singleyi (St.), one adult and one juv.; known from Alabama to Mexico.

Eupera singleyi Pils. (?), one puerile, somewhat different from the southern Texas; less inflated, beaks pointed.

Remarkable is the abundance of some *Bifidariæ* compared with the scarcity of others and of *Vertigo*; also the total absence of *Vallonia.*

Drift material is a valuable asset for faunal studies, giving "pointers," and should be carefully collected wherever possible. It might be suggested, by the way, that not too fine a sieve or strainer should be used, one of about six meshes to the inch, although the siftings may become rather bulky.

But then local collecting should be done in order to have the species and forms from their several habitats, the specimens fresh, with the soft parts, for studying their relations. In the present instance this would be desirable especially with respect to the small *Zonitidæ*, which appear to need a careful revision on good material from many places.

To Dr. Pilsbry I am indebted for the identification of some species.

NOTE ON THE OCCURRENCE OF A GIANT SQUID OFF THE CALIFORNIA COAST.

BY S. S. BERRY.

Outside of Alaska the largest species of squid which has heretofore been recognized from the Pacific Coast of North America is the *Dosidicus gigas* (d'Orbigny), which ranges north at least as far as

Monterey, and is in proper season a fairly frequent inhabitant of the waters just off shore, attaining a length of four or five feet. It is with considerable interest, therefore, that I have recently received information from Dr. C. H. Gilbert, of Stanford University, regarding the occurrence of a much more formidable species, as represented by a single specimen found dead and floating on the surface of Monterey Bay by some of the Monterey fishermen in June, 1911. The monster was brought to shore and dragged up on the wharf, where it was measured by one of the men receiving fish and cast back into the water. He reported that its dimensions, inclusive of the tentacles, were over thirty feet. The animal was in very bad condition, there was no color left, and the epidermis had all sloughed off. Unfortunately, Dr. Gilbert was not at Monterey the particular day that the creature came in and did not himself see the specimen, so no attempt was made to preserve any portions whatever for purposes of identification. Although it would be fatuous to hazard a suggestion as to what species was here represented, we can at least affirm that it was most certainly not *D. gigas*.

Of course newspaper and magazine accounts of off-shore encounters with even more titanic monsters than this one are frequent enough, but from the nature of the case it seems worth while to place even the most meager facts on record whenever any really definite data are to be obtained.

Stanford University, October 8, 1911.

A NEW PLANORBIS FROM MICHIGAN.

FRANK C. BAKER.

Mr. Frank Smith, Associate Professor of Zoology of the Illinois State University, recently submitted some molluscan material for identification, collected in Douglas Lake, Cheboygan county, Michigan. Among the Planorbis is one form which seems to have been unnoticed, and which is easily separable from all other forms. It may be described as follows:

PLANORBIS CAMPANULATUS SMITHII nov. var.

Shell discoidal, solid, the aperture sinistral; periostracum light

horn colored, frequently stained reddish from the iron oxide in the water; surface shining, lines of growth very heavy, more or less rib-like, equidistant; spiral lines absent or very faint; whorls 4½, closely coiled; spire flat, or a little convex, all but the last whorl coiled in the same plane; umbilicus wide and deep, somewhat funnel-shaped, exhibiting two and one-half whorls; the whorls are sharply carinated above and below, the last whorl being particularly so marked; this carination of the whorls causes a flattening of the periphery; the last whorl at a point about midway suddenly bends upward, causing the aperture to be elevated half the diameter of the whorl above the spire, and also causing the umbilicus to form a crater-like contour when viewed laterally; aperture campanulate, wider below and angled above; the sutures are distinctly marked, even channeled in some specimens; outer lip sharp; inner lip appressed to body whorl, which is covered with a callus.

Height of last whorl	Greatest diameter	Least diameter	Aperture height	Aperture breadth
9.00	17.00	12.50	9.00	6.50
8.50	16.75	13.50	8.50	8.50
8.00	15.00	11.75	7.00	6.00
7.50	18.00	13.50	8.50	8.00

This was at first thought to be Dall's *rudentis*, but by a comparison with his description[1] and with specimens believed to be authentic, it was seen to be quite different. The spire of *rudentis* is flat and *elevated* above the last whorl, forming, as observed by Dall, an aspect like a miniature coiled hawser. In *smithii* the spire is depressed and more or less funnel-shaped. In *rudentis* the last whorl is *deflected*, being on a plane or a trifle below the base of the shell, while in *smithii* the last whorl is elevated far above the plane of the spire. The umbilical region is also very different in *smithii*. The sharply carinated whorls also afford a striking difference. Typical *campanulatus* is smaller, the whorls are usually coiled in the same plane and the whorls are rounded and not sharply angulated. *P. smithii* was at first thought to be a good species, but the presence of the typical form in the lake, which shows marked variation toward the *smithii* type, leads to its restriction as a strongly marked variety.

[1] Alaska Moll., p. 90.

Over 200 specimens of the new variety have been examined and its novelty seems constant. Both *rudentis* and *smithii* represent extremes of variation of a common type. It is named in honor of Professor Frank Smith, who collected the specimens.

NOTES.

Polygyra clarkii bradleyi n. var. Similar to typical *clarkii*, but lacks the basal tooth. It has the base malleate but without strong radial sculpture.

Alt. 10.5, diam. 14 mm.

Locality: Black Rock Mt., Rabun Co., Georgia. Type in the collection of the Academy of Natural Sciences, no. 104800. Named in honor of the collector, Dr. J. Chester Bradley. Figured on plate VIII, to appear next month. E. G. Vanatta.

Maine Pearls.—Fresh-water pearls are obtained in Maine, as far as I know, exclusively from *Margaritana margaritifera* Linné. Eight or nine years ago this noble mollusk was abundant in the small streams about my home at Buckfield, Maine; but its numbers have since been regrettably thinned by the ravages of pearl-hunters. Probably, however, it will not be exterminated, since some individuals will remain in hidden and inaccessible situations.

I have found pearls rather copiously while collecting large mature shells for specimens; but most of them were dull or leaden-colored. The largest shells found exceeded six inches in length.

I recently conversed with a carpenter of Turner, Maine, who has hunted pearls in his spare time. He did not destroy the clams indiscriminately, as is done by the more ignorant and reckless pearl-hunters, but only opened those which indicated by some external malformation the probable presence of a pearl. He said that many of the clams lived buried completely below the surface. These were imbedded in the sand at the bottom of the brook and covered by a layer of mud of vegetable origin perhaps six inches thick.

He found one very large and fine pearl, spherical, "about as big as a marble," in a conspicuously deformed shell. This brought him $400, and it may be presumed that the ultimate purchaser paid a considerably larger sum for it.—John A. Allen.

The Nautilus.

Vol. XXV. MARCH, 1912. No. 11

THE MOLLUSCA OF MONTE SANO, ALABAMA.

BY H. E. WHEELER.

Monte Sano is one of the most picturesque spurs of the Cumberland Plateau. It is situate in Madison County, Alabama, just east of the Huntsville meridian, and rises nearly 1000 feet[1] above the valley in which the city of Huntsville lies.

Going east from the heart of Huntsville the pike first crosses a ridge known as Little Mountain, the home of many a choice shell, and then winds its way up the noble brow of Monte Sano, and around to its eastern slope, giving an all-around view of the splendid valleys below from the south and west to the north and east. From the city the distance is nearly five miles. On account of its salubrious climate it is far famed as a summer resort.

In all this limestone region many "Big Springs" are to found. They issue from large caves, or rise from the foot of a bluff, continuing oftentimes on the surfaces the course of subterranean creeks, perhaps connecting some of the smaller rivers at their sinks with the Tennessee River which is but ten miles distant from Huntsville on the south. These springs furnish the coldest water in the state. The valleys of the table lands are the work wholly of erosion,[2] and

[1] The elevation of Monte Sano is given on the topographic sheets of the U. S. Geological Survey as 1600 feet.

[2] See McCalley, Valley Regions of Alabama, I. p. 14 seq.

are everywhere developing many deep and shaded coves, which for the trained collector are a thing of beauty and a joy forever.

The mountain streams of north Alabama flow through a region as attractive to the tourist as it is fascinating to the collector. Who knows what knowledge lies buried in the dashing waters of Hurricane Creek, or waits some intrepid wader in the numerous shoals of Flint and Paint Rock rivers?

Monte Sano is already a classic collecting ground. Years ago it was made famous by its subcarboniferous fossils, and many a botanist has climbed with eagerness its precipitous slopes. Here the curious Chittamwood (the Great American Smoke Tree)—*Cotinus cotinoides* (Nutt.) Britton, whose type locality is the Grand River, Arkansas, finds a congenial home.[1] It is not improbable that it was rediscovered by Buckley on this very mountain.

But to the conchologist Monte Sano is chiefly interesting as the type locality of three land shells, all of which were introduced to science by that indefatigable naturalist, Professor Herbert H. Smith, whose versatility of mind, keenness of vision, and scientific caution universally commend him.

Carychium nanodes Clapp,[2] is one of the smallest, if not the smallest, of all land shells. It prefers the damp woods, hiding between half-decayed leaves in sheltered situations, near the mountain top. *Vitrea lewisiana* Clapp,[3] is still to be considered one of our rarest shells. The yellow animal is clearly visible through the thin white shell, and when crawling on the under surface of the dull-colored rocks, which it seems to prefer, makes a most pleasing picture. *Polygyra smithii* Clapp,[4] has a very evident fondness for mud and clay. Even when it shows itself on some damp day in the crevices of an old wall, or on a pile of rocks, its hirsute epidermis betrays its domicile, and often, under logs, it is found partially buried or "balled" in clay. When cleaned up, however, by gently brushing under tepid water, a method which preserves the hairs (and for

[1] Mohr, Plant Life of Alabama, pp. 34, 84, 600, and Plate VI. See also Gattinger, Flora of Tennessee, p. 114, where for "Limestone County," read "Madison County."

[2] Nautilus, Vol. XIX, p. 91.

[3] Nautilus, Vol. XXI, pp. 129, 130.

[4] Nautilus, Vol. XIX, pp. 73, 74.

which important discovery we are also indebted to Professor Smith), it makes a most attractive appearance.

The following list cannot be complete, or even nearly so, as the writer was able to do only occasional field work in a busy pastorate of a single year at Huntsville. The species listed were collected partly on Monte Sano and partly from the contiguous territory. The determinations have been made largely by Mr. Bryant Walker, although I am indebted to Mr. Geo. H. Clapp and to Professor Smith for much help.

Gastropoda.

Helicidæ.

Helicina orbiculata Say. Common. Thousands may be gathered on damp days from the cedar trees or from the moss-grown limestone rocks. The *Pyramidulas* and *Pupidæ* are also lovers of cedar.

Helicinidæ.

Polygyra plicata Say.

Polygyra troostiana Lea. This and the preceding species are gregarious. But the one species is not apt to be found in association with the other.

Polygyra fraudulenta Pils. Common on all the mountains, but *Polygyra tridentata* Say, though probably here, was not collected.

Polygyra inflecta Say.

Polygyra albolabris Say.

Polygyra fuscolabris Pils. The racial validity of this species impresses the collector more than it would the student within doors. It is a shell of the mountain tops, choosing the crevices of large rocks and cave entrances preferably, though sometimes found under logs. It is not easy to bridge the gap between this and *albolabris* by a series collected in the same locality. The pink lip, however, is not a constant character, being nearly as often white as pink. But its larger size, splendid symmetry and richer color readily endorse it for specific rank.

Polygyra zaleta Binn. More common on the lower ridges. Here it often develops a lilac "bloom." *Polygyra elevata* Say, not found on Monte Sano, is reported from Gurley, Alabama, collected by Prof. Smith.

Polygyra palliata Say. Collected by Prof. Smith in the lowlands south of Huntsville, July, 1910.

Polygyra obstricta Say.

Polygyra obstricta carolinensis Lea. Between the species and the variety there is no dividing line.

Polygyra sargentiana J. and P. A young shell from the south end of Monte Sano is certainly this species. At Gurley, ten miles east of Huntsville, a smooth form of *sargentiana* is common, and will likely be found also on Monte Sano.

Polygyra appressa Say. Quite common in gardens.

Polygyra appressa perigrapta Pils. *Appressa* is the common form in this region, contrary to the usual collector's experience in North Alabama.

Polygyra thyroides, Say.

Polygyra spinosa, Lea.

Polygyra stenotrema, Fer.

Polygyra hirsuta, Say var. Differs constantly from typical hirsuta by its smaller size and pronounced apertural features.

Polygyra fraterna aliciæ, Pils.

Polygyra rugeli, Shutt.

Polygyra smithii, Clapp.

Bulimulidæ.

Bulimulus dealbatus, Say.

Pupillidæ.

Strobilops labyrinthica, Say, var.

Pupoides marginatus, Say.

Bifidaria procera, Gld.

Bifidaria armifera, Say.

Bifidaria tappaniana, C. B. Ads.

Vertigo rugosula, Sterki.

Vertigo ovata, Say.

Vertigo concinnula, Ckll. Very rare. Previously reported only from the Rocky Mountain region; determined by Dr. Pilsbry.

Circinariidæ.

Circinaria concava, Say.

Zonitidæ.

Omphalina kopnodes, W. G. Binn. This species attains its maximum development in this region. It is an abundant species, preferring the lower ridges rather the mountain-tops.

Mesomphix lævigata, Pfr.

Mesomphix lævigata latior, Pils. Save in a characteristic green color, this subspecies is almost inseparable from lævigata *ipse*.

Vitrea carolinensis, Ckll.

Vitrea indentata, Say.

Vitrea lewisiana, Clapp.

Vitrea (Paravitrea) capsella, Gould.

Vitrea radiatula electrina, var. circumstriata, Taylor. This shell has also been identified from Arkadelphia, Arkansas by Mr. George H. Clapp. The species may be found all the way between, but Arkansas is at present its southwestern limit.

Vitrea (*Paravitrea*) *multidentata* Binn. This extra-limital locality for *multidentata* evidences the keenness of Mr. Smith's eyes. It is very rare, and found only in sequestered cleavages of the rocks on the mountain terrace.

Euconulus chersinus Say.

Euconulus sterkii Dall. Only one specimen found.

Zonitoides arboreus Say.

Zonitoides minusculus Say.

Zonitoides milium Morse.

Gastrodonta suppressa Say.

Gastrodonta interna Say.

Gastrodonta ligera Say.

Gastrodonta g ılaris Say.

Gastrodonta demissa Binn.

Gastrodonta collisella Pils. Rare.

Endodontidæ.

Pyramidula alternata Say.

Pyramidula cumberlandiana Lea. Found on Smither's Mountain, a peak five miles northwest of Huntsville. Not on Monte Sano.

Pyramidula perspectiva Say.

Helicodiscus parallelus Say.

Punctum pygmaeum Drap.

Succinea sp.?

Lymnæidæ.

Lymnæa humilis Say.

Lymnæa columella Say.

Lymnæa obrussa Say (= desidiosa Binn.).

Ancylus sp.? Braham's Springs, west of Huntsville.

Ancylus sp. nov. Mastin's Lake, two miles north of Huntsville.

Ancylus sp. Collected from Braham's Springs, west of Huntsville.

Planorbis parvus Say.

Planorbis parvus Say, var. A minute form from Mastin's Lake, which may prove to be new.

Planorbis bicarinatus Say.

Planorbis alabamensis Pils.?

Planorbis trivolvis Say. Flat form.

Physidæ.

Physa sp. These shells collected in Mastin's Lake are probably *crocata* Lea (Walker), which is, however, only a form of *microstoma* Hald. (Crandall). See NAUTILUS, Vol. XV, p. 70.

Physa halei Lea. Braham Springs.

Physa distorta Hald. From Big Spring Creek.

Auriculidæ.

Carychium exile H. C. Lea.

Carychium nanodes Clapp.

Pleuroceratidæ.

Goniobasis striatula Lea.

Pleurocera excuratum Con.

Pleurocera brumbyi Lea. This and the two preceding species were collected from Big Spring Creek.

Pleurocera currierianum Lea. From Bird Spring.

In "The Fresh Water and Land Shells of Alabama," by Dr. James Lewis, M. D., *Goniobasis perstriata* Lea and *Goniobasis decampii* Lea are listed from Huntsville. But like many other species in our smaller streams, they may be already exterminated by the ducks and geese. *Campeloma lima* Anthony and *Somatogyrus currierianus* Lea are also given as coming from Huntsville, but I obtained no specimens.

Viviparidæ.

Vivipara contectoides Binn.

Campeloma coarctata Binn. (non Lea). From Bird Spring.

Pomatiopsidæ.

Pomatiopsis lapidaria Say.

Corbiculadæ.

Musculium elevatum Hald.
Pisidum virginicum Say.

NEW CALIFORNIAN MOLLUSCA.

BY WM. H. DALL.

During the later portion of the life of the late W. C. Goforth, he paid much attention to the natural history of the places in California which he visited, and made some collections which were transmitted to the U. S. National Museum after his death by a relative, Mrs. Emma C. Ingersoll. Among them were two or three small specimens of shells, supposed to have been collected at Monterey. Curiously enough, one of these specimens represents a species hitherto undescribed, and which it gives me pleasure to name in honor of the regretted collector.

Aesopus goforthi Dall, n. sp.

Shell smooth, slender, elongate, with inconspicuous sutures and about eight whorls; nucleus defective, smooth; subsequent whorls gradually increasing, moderately convex; color greenish-waxen with flammules of dark chestnut so arranged on the last whorl as to form two irregular bands, one above and the other below the periphery, which also show in the interior of the aperture and on the base of the pillar; the paler portion of the surface is also irregularly mottled with opaque whitish blotches. Aperture short, rather wide; the outer lip simple, sharp, smooth within; body and pillar smooth, with a thin wash of callus; canal short, wide, not recurved. Length of shell 13, of last whorl 6, of aperture 4 mm., max. diam. of shell 3.3 mm.

Type No. 249624, U. S. N. Museum.

While destitute of the spiral sculpture which marks many species of the genus, it is not without smooth congeners as, for instance,

Aesopus metcalfei Reeve, of the Antilles. The coloration recalls that of the common Californian *Astyris*.

An examination of the siftings dredged by Mr. C. W. Gripp, outside the Kelp beds off the entrance to San Diego harbor, in 16 to 20 fathoms, has resulted in the discovery of several interesting shells. *Mangilia interlirata* Stearns has its range extended southward from San Luis Obispo, A new species of *Rochefortia*, and a minute shell probably allied to the Corbulas, but requiring a new generic name, were among the prizes.

GRIPPINA Dall, n. g.

Shell slightly inequivalve, donaciform, small, with a well-marked, rounded, ascending pallial sinus; right valve receiving the dorsal edges of the left in grooves beneath its own dorsal margins; cardinal teeth two, large, subequal, prominent, horizontally produced and fitting under the beak of the left valve; resilium strong, compressed, situated between the two cardinals attached under the beak of the left valve, and having on its ventral surface a thin calcareous coating or ossiculum.

This genus differs from *Corbula* in the nearly equal valves, the distinct pallial sinus, and the absence of a resiliifer in the left valve; in *Corbula*, too, the posterior cardinal is rarely developed and always very inferior in size to the anterior tooth. The form of the teeth in the two genera is quite different. Type:

Grippina californica Dall, n. s.

Shell minute, subtrigonal, whitish, solid for its size, finely concentrically sculptured; beaks moderately elevated, smooth; inner margins of the valves smooth, the left valve with no hinge-plate; a narrow lanceolate lunule and subequal, similar escutcheon present; each bounded by a marked ridge; outside of the escutcheon a second radiating ridge extends from the beak to the lower posterior margin of the valves but without producing a notable angulation of the margin. Interior of the valves dull white, the muscular impressions and pallial line distinct. Length 2.5, height 1.2, diameter 0.7 mm.

For other details see the generic description.

Rochefortia grippi Dall, n. s.

Shell small, thin, equilateral, ovoid, with a dull brownish perios-

tracum, more or less incrusted with iron oxide, and sculptured only by feeble incremental lines. Beaks inconspicuous, hinge as in the genus, bearing two very small diverging cardinals in one valve with a rather strong resilium between them which seems to carry a small lithodesma; opposite valve edentulous; pallial line entire; inner margins of the valves simple. Length 4.5; height 2.5; max. diameter 1.3 mm.

This species is proportionately much more elongate than any of the other Pacific coast species and can be recognized at once by its form. All of the others are more or less conspicuously equilateral, and nearly all are larger.

Habitat: with the preceding. The species is named in honor of its discoverer. Only one specimen of this and the preceding species has been seen. The present specimen within the valves had a large number of minute smooth larval bivalves, but whether they belong to the same species is uncertain, since the specimen did not contain any of the fleshy portions of the animal.

NOTES ON ANODONTA COUPERIANA AND A. GIBBOSA.

BY L. S. FRIERSON.

In the "Synopis of the Naiades" of Mr. C. T. Simpson (1900), it is stated that the *Anodonta couperiana* Lea (with its variety *A. dunlapiana*), is a synonym of the *Anodonta gibbosa* Say. In this statement Mr. Simpson is followed by nearly all students who have handled the subject, rendering a difficult study still more confused. These species are quite distinct and belong to separate groups, and even possibly to *different genera.*

Anodonta couperiana is a fairly common species in most collections of any size. It is a handsome shell, with a bright, shining epidermis, and I am informed by Mr. T. Van Hyning that it very seldom cracks as other *Anodontas* are so prone to do. Its umbones are like those of *Anodonta imbecillis* Say, *i. e.*, they hardly rise above the hinge line. The corrugations are similar to the *imbecillis*, and some specimens verge towards the *Ano suborbiculata* of Say, which, despite its large size and different shape, belongs to the same group.

On the other hand, the *Ano. gibbosa* Say, is a rather rare shell and *generally misnamed.* It is remarkable for the great protuberance of its beaks and umbos, and the swelling of the umbos continues (with the growth of the shell) *downwards* and *backwards.* This peculiarity gained for the species its name. *A. gibbosa* belongs to the group of *cataracta* Say, having a double row of undulations on its beaks, and it is really very doubtfully distinct from this variable species.

Mr. Lea, having obtained specimens of this shell, in which the umbo to post-basal swelling was not very pronounced, he made a new species, which he called *A. dariensis.* The *gibbosa* being a rare shell, as such its identity has well-nigh been lost. For example, a *typical* specimen, so-called by the late G. W. Tryon, was labelled as *A. dariensis* by Mr. Simpson, and the *Anodonta dariensis* figured by Sowerby is a *gibbosa.* So also is the *gibbosa* figured by Sowerby (or Reeve) in plate XI, fig. 23. (This figure is not mentioned by Mr. Simpson). The shell is well figured also by Clessin, plate XVIII, figs. 3 and 4, under its proper name. Mr. Simpson refers these figures to *gibbosa* Say, correctly. But he also refers (as this species) to Sowerby's *couperiana*, and especially to Clessin, plate 50, figs. 3 and 4.

Evidently Mr. Simpson did not compare these figures with one another, for that Clessin's plate 50 figures 3 and 4, and plate 18, fig. 3 and 4 represent two entirely diverse species would be apparent to the veriest tyro. Couperiana, Lea (with *its variety* dunlapiana) then is to be recognized as a good species, and gibbosa, Say is also a good species with dariensis as a synonym, or at best a variety.

POLYGYRA ALBOLABRIS ALLENI WETH., AND OTHER MISSOURI HELICES.

BY F. A. SAMPSON.

Years ago when collecting shells at Eureka Springs, Arkansas, Charles C. Allen, then of that place, later of Florida, became interested in conchology, and a variety of *P. albolabris* found there was named for him by Prof. Wetherby, and it has since been decided that all of the *P. albolabris* west of the Mississippi and south of Iowa are of that variety.

I have in my collection specimens from sixteen counties in Missouri, and these vary greatly in size from 18 mm. to 32 mm. diameter. The largest is from Scott county in southwest Missouri; from Galena, Stone county they vary from 26 to 30 mm.; from Boone county from 23 to 30 mm.; and from Kansas City 18 to 27 mm.

The specimens from Kansas City are interesting, and the average size at two points within the City differs quite markedly. From an old cemetery near Main and 27th streets I collected more than ninety living shells, and from the bluffs about the Union Station I found eight dead shells; ths following table will show the sizes from the two places:

Diameter, Mm.	Cemetery.	Bluffs.
18	2	
18.5	2	
19	11	
19.5	7	
20	20	1
20.5	8	
21	16	
21.5	6	
22	7	
22.5	5	
23	5	1
23.5	1	2
24	1	1
24.5		1
25	1	1
27		1

At Boonville I found one dead but fresh shell of *Polygyra multilineata* Say, the only one I have found in the State. The *Polygyra divesta* Gld., is found living in the southern counties of the State, and I have it from the Postpliocene at St. Joseph. From the Postpliocene of Boone and Moniteau counties I have the *Polygyra profunda* Say, but have not found it living in the State. To the NAUTILUS for June 1894, I noticed finding *Polygyra andrewsæ* W. G. B. in St. Francois county. I have *P. pennsylvanica* from St. Louis county, and from the Postpliocene of Boone county.

HENRY M. EDSON.

We deeply regret to announce the tragic death of Henry M. Edson, of Palo Alto, California. In alighting hastily from a car he was struck by a passing train, death resulting from the injuries received. He was 35 years of age and a native of New York. He had served in the army in the Philippines and received an honorable discharge. Of late years he became greatly interested in the study of mollusks, contributing a number of articles to THE NAUTILUS. His genial disposition won him many warm friends.

NOTES.

MODIOLUS DEMISSUS VAR. PLICATULUS LAM., IN BROOKLINE, MASS. Until two or three years ago this marine shell lived in a little piece of marsh at Cottage Farm, along the south side of Commonwealth avenue, between Essex and St. Paul streets, the marsh having an outlet under Commonwealth avenue and the Boston and Albany Railroad into the Charles River. The first improvement detrimental to the life of the mussels was the building of the dam forming the Charles River basin and shutting out the salt water from that part of the river. The persistent oiling of the ditches to destroy mosquitoes, and finally a public dump preliminary to forming a street, has so polluted the marsh as to undoubtedly cause their death.

C. W. JOHNSON.

POLYGYRA LAWÆ.—While examining some *Polygyra lawæ* Lewis, collected by Herbert H. Smith at Woodstock, Bibb county, Ala., I noticed that they are covered with very fine, short hairs arranged in diagonal rows. As this character is not mentioned in the description given in Binney's "Manual," p. 317, I examined four adults and one young in the Dr. James Lewis collection from Hayesville, N. C., and, while the shells have the appearance of being weathered, a magnification of 10 diameters showed the hair-scars. Perfectly fresh specimens have a beautiful silky lustre and the embryonic whorls are densely granulated like the *Stenotremas*.

GEORGE H. CLAPP.

The Nautilus.

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OREOHELIX COLONIES IN COLORADO.

BY JUNIUS HENDERSON.

The native species of land snails in Colorado are mostly small—from the size of *Pyramidula cockerelli* down to *Vertigo* and *Vallonia*. The only known exception is the genus Oreohelix, which is much better represented, both in numbers of species and abundance of individuals, than has generally been supposed. My first experience with the genus was along the eastern foothill belt of the Rocky Mountains, the eastern limit of its range in Colorado. There I found *Oreohelix strigosa depressa* Cockerell (then considered *O. strigosa*), very generally but sparingly distributed, never obtaining more than half a dozen live or freshly dead specimens. Several facts led to the natural conclusion that the genus was approaching extinction in Colorado. (1) The scarcity of live specimens along the foothills. (2) The occurrence of large numbers of fossil specimens in a small exposure near Boulder, taken in connection with the widespread belief in a marked desiccation of the West and Southwest since middle Pleistocene time, which would make conditions less favorable for these snails. (4) Ingersoll's report (Hayden Survey, Ann. Rept., 1874, p. 396; Binney's Land Shells, p. 166) that dead *O. cooperi* were abundant in North and Middle Park, but that live ones were not common. (4) Numerous dead shells received from various localities west of the Continental Divide, with no live ones. (5) The occurrence of *O. haydeni* fossil in large numbers near Glenwood Springs, with no live or freshly dead ones reported.

More recent discoveries have rendered that view wholly untenable.

During the past five years all the species of the genus now known to inhabit Colorado have been found alive in flourishing colonies, so that it seems probable they are as abundant as they ever were.

The first important colonies to come to my attention were of *O. haydeni* Gabb and variety *gabbiana* Hemphill, discovered on the bluff above the Hotel Colorado, at Glenwood Springs, by the well-known botanist and naturalist, Professor E. Bethel, of Denver. The colonies were in close proximity, one above the other. They were on limestones, sandstones and calcareous shales. *O. haydeni* was easily recognized, but the others were sent to Dr. Pilsbry, who wrote:

"The shells are indistinguishable from *O. haydeni gabbiana* Hemphill. It is also to be noted here that Hemphill found *gabbiana* and a form with strong spirals, hardly separable from typical *haydeni*, on the same mountain-side, though in separate colonies."

Unfortunately Professor Bethel's vivid and interesting description written at the time, was lost in transit to Dr. Pilsbry, and I have never been able to get him to attempt to rewrite it.

Later Mr. Albert Dakan, of Longmont, visited the locality and collected both species, though I am not certain that they are from exactly the same colonies. He locates his *haydeni* colony on a limestone formation "on the mountain-side on the north side of the Grand River just above the point where the Glenwood water-main crosses it." His *gabbiana* colony he places on Blocks 51 and 52 of the town plat. His account of *gabbiana* throws such light on the habits of the genus, is so in accord with my own experience elsewhere, and so well explains why live *Oreohelix* have not been found abundantly in the State by earlier collectors, that I feel justified in quotting it somewhat fully, as follows:

"While returning from a little climb on the hill at the northeast corner of the town, on the afternoon of April 8, 1908, I noticed a few snails, and gathered what scattering ones I could find on a zigzag course down the hill-side. I had gathered up nearly a handful, when suddenly one that was in my fingers showed signs of life. This aroused a lively interest in the search, but it was some little time before the second live one was found. After that they were easy to find. My hands were soon full, but mostly of dead ones. Not caring to discard any of them I went to the foot of the hill and ot a three-pound lard pail and then went after them in earnest.

The hill-side is covered, though not thickly, with low brush and scattered bunch-grass. The earth is of disintegrated calcareous shale. Under the clumps of bushes was a sprinkling of dead leaves matted down by the winter's snows. Here were snails by the hundred. It was a populous city of slow-feet all out on parade. There had been light showers during the afternoon. The ground was very damp, but not muddy. Everywhere the snails were erect, and as the eye became accustomed to their appearance when in motion their numbers seemed to greatly increase. I soon had over a pint of live specimens—enough, it would seem to satisfy anyone that there is one place at least in Colorado where lack of numbers and difficulty of access cannot be pleaded as an excuse for not knowing more of the habits of this creature. Two days after the above find I returned to the snail city in company with Mr. Underwood, principal of the local high school. Neither he nor his instructors knew of the existence of the live snails so near town. It was about five o'clock in the afternoon. The weather had cleared up and the hill-side was comparatively dry. I had been enthusiastic in telling of the number of snails to be found, so was not a little surprised in not finding immediate verification of my story. Indeed, very few were to be found. I went from clump to clump of bushes, each time disappointed, for, where two days before there were hundreds, now none could be seen. Then I began a closer search. Snail habits were unknown to me, but their ability to hide so effectively was about the last thing thought of. We soon began to find them under sticks, roots, bunch-grass and stones, and in the small crevices of the loose earth. None of them had migrated. Under one protecting stick a dozen or more were found. Soon we had nearly a pint of shells, each full of life. It was then easy to understand why they had not been discovered. Human pedestrians do not choose drizzly days for their strolls, while such weather is the snail's delight. But in dry weather they very effectually hide themselves. It is easy to find the bleached, white, empty houses of the dead, while in life the snails are so nearly the color of the ground that they easily escape notice. In fact, it would be hard for the untrained eye to see them even when exposed to view. This I appreciated more fully after I had placed about a dozen of them on the ground near the rear wall of my home. The ground was dry and the snails were soon practically out of sight. I have been speaking of them in hundreds, but after a

more careful view will increase to thousands the numbers which may be seen under favorable conditions. Several pairs were observed in the act of copulation—in fact, this was a very common thing on this visit."

Mr. Dakan found another colony of *gabbiana* at Newcastle, where he collected over a thousand live ones in twenty minutes. Since then I have collected all along the Grand Hogback from Newcastle to Meeker and north to Axial, up White River to Trapper's Lake and Marne Lakes, in North Park and Middle Park, and everywhere under favorable conditions have found the shells of this genus in great abundance, each species usually occupying a colony by itself, though in some instances they intermingled. While scattering ones are found elsewhere, they are abundant only on slopes or ledges of limestones or calcareous soils or shales, where there are bushes of various kinds. They are found indifferently under sage brush, wild rose bushes, mountain mahogany, *Amelanchier* and many other bushes, but are not often abundant under aspens or oaks, in this respect differing from the smaller species of snails. Loamy, willow-covered bottom-lands do not appeal to them. Where they occur in numbers they are easily found alive on moist days, when it is raining or the bushes are dripping with fog or dew. I have seldom found other snails common where *Oreohelix* are abundant.

Without attempting to enumerate all the localities from which a few specimens have been collected, I give below a summary of the more important colonies and some other records to show the general distribution of the species, the collector's name being given except where I conducted the material myself, these records being all based upon material in the University of Colorado Museum.

Oreohelix strigosa depressa Ckll.

To this form I have assigned all our Colorado material formerly considered *strigosa*. Present but not abundant usually along the eastern foothills of the Front Range from Pueblo to Belleview. The finest specimens we have are a few from an altitude of 11,000 feet on Mt. Audubon (A. Mackenzie, 1905), one very strigose specimen from near Ohio City, at 11,800 feet (Frank Rohwer). A few are from Treasury Mountain, Gunnison county, at 10,900 feet (Prof. R. D. George). The highest record is from 14 miles west of Leadville, at 12,700 feet (H. A. Aurand). Binney and Cockerell have

recorded it from Durango. A thriving colony was found just north of Morrison (Rohwer).

I visited this colony on September 23 with Mr. Rohwer, and find it the most remarkable yet discovered east of the Front Range. Though scattered snails were found over the whole slope above, they were abundant only under three small groups of skunk-bush (*Rhus trilobata* Nutt.), where the soil contained many fragments of limestone which had slid down from up the slope, the aggregate area of the groups covering less than 100 square feet. Under one root were 46 specimens clinging one to another in a cluster. As they average over three-fourths of an inch in major diameter, one may imagine the size of the cluster. On the under surface of a board on an area of 48 square inches, 98 were found, making almost two layers. Under a rock 5 by 6 inches were 23. Within a radius of 8 inches were 80. These were all alive. In a short time we collected 953 live ones. Though the weather had been exceedingly dry and warm for weeks, they were scarcely buried, the soil being too hard for them to burrow into had they wished to, except an inch or so of debris and leaves on the surface. In digging we found none deeper than 3 or 4 inches, none below the loose debris, mostly barely covered and many exposed, but all dormant. We carried them home in a box and the combined moisture of the mass seemed sufficient to awaken them, so that the next day they were all active and their shells moist. This may suggest the reason for clustering in this semi-arid region.

With this exception, the finest colony yet reported is one I found last August north of the river a mile below Steamboat Springs, on a steep, dry, south-facing slope of lower Mancos Cretaceous shales and limestone. Time was too limited for much collecting. At the first point of contact with the colony *O. cooperi* predominated, while less than half a mile to the west *depressa* predominated, thus: At the west 112 *depressa* and 16 *cooperi* collected; at the east 106 *cooperi* and 77 *depressa*. Hot, dry weather, live snails well concealed. A considerable proportion of both species were quite dark and many showed the color characters of *O. s. albofasciata* Hemphill, the upper dark band extending to the suture, the lower one to the umbilicus, with a white band on the periphery, but other examples showed complete gradation into the typical forms. As I have found this variation and gradation in other colonies of each of the two species, and finding none that cannot be referred to one or the other, the record

of *albofasciata* should be eliminated from the Colorado list. Not having seen Utah specimens of Hemphill's sub-species, I cannot say whether it is valid.

Oreohelix cooperi (W. G. B.)

I have seen no live ones east of the Front Range, and but few dead or fossil ones, but it is exceedingly abundant on the outcrops of lower Mancos (or Niobrara and Benton) cretaceous limestones and calcareous shales, nearly everywhere I have been west of the Front Range, as well as on the Mesa Verde sandstone slopes at Rio Blanco and at Axial, probably where thin limestone bands in the sandstone furnished lime for the soil. Also found it more sparingly up White River to Trapper's Lake, 10,000, feet. Abundant dead but fresh shells have been found on the Laramie, North Park, near Gleneyrie (Wm. Fleming). Probably a search would have revealed a strong living colony. A flourishing colony of large live ones occurs at Montrose (Bethel) and a few dead ones came from Wolcott. There are many fine colonies on the Benton and Niobrara formations in the valley of Muddy Creek, north of Kremmling, Middle Park. One of the best is about 25 miles north of Kremmling, on a dry, unmixed sage brush terrace, with no protection except the scattered and dwarfed sage a foot or two high, yet the shells are about of normal size. On a south-facing, brush-covered slope of calcareous shales, on the north side of the creek where the wagon road from Kremmling to Steamboat Springs crosses the southwest corner of North Park, on a moist morning last July I collected 511 active specimens in a short time on a distance of 72 feet along the trail, without including the numerous young ones and only taking those easily seen without searching. At one point there were 19 crawling about within a radius of five inches. Altitude 8,860 feet. In adjacent bottomlands, where a black loam was covered by scrub willows, there were no snails. Ten were found in an aspen grove half a mile away, including one albino. At Rio Blanco a thriving colony was found under aspens, and at Newcastle a fine lot were obtained from beneath narrow-leaved cottonwoods. At Steamboat Springs, in addition to the mixed *strigosa-cooperi* colony, I found a pure *cooperi* colony, yielding abundant very robust specimens, on the west side of the river above the town. The center of abundance was in a narrow-leaved cottonwood grove on a steep, east-facing slope,

where the soil probably receives considerable lime from the limestones further up the slope. Altitude 7,000 feet. The snails were hiding under rose, sage and other brush, but not hard to find. The colony extended over the whole slope, but individuals were scarce in the aspen and scrub-oak groves. Throughout the whole region I have not found the snails abundant on the non-calcareous formations.

(*To be concluded.*)

A REVISION OF THE ANCYLI OF SOUTH AFRICA.

BY BRYANT WALKER.

Several months ago Messrs. H. C. Burnup of Maritzburg, Natal, John Farquhar of Grahamstown, Cape Colony, and John Ponsonby and M. Connolly of London, placed in my hands for examination a large collection of the *Ancyli* of South Africa. In order that the results of the investigation might be available for immediate use elsewhere, the following summary has been prepared. A fully illustrated report with complete bibliographic references, comparative remarks, etc., is in preparation and will be published in the immediate future.

The region included in the report is bounded on the north by the Zambesi and Kunene rivers.

Genus ANCYLUS Geoffroy.

Section *Burnupia* n. sec.

Shell dextral; apex punctate, in a more or less radial pattern.

Type: *Ancylus caffer* Krauss.

I. *Ancylus caffer* Krauss.

1848. *Ancylus caffer* Krauss, Sudafr. Moll., p. 70, pl. 4, fig. 13.

1859. *Ancylus gaulus* Gould, Pr. B. S. N. H., VII, p. 40.

Type locality: (*caffer*), Pietermaritzburg, Natal.

(*gaulus*), Cape of Good Hope.

Also: Umkomaas; Imputyni stream near Maritzburg; Inkwalini stream near Maritzburg; Tongaat; and Equeefa River, Natal (Burnup).

Var. *nanus* n. v.

Shell smaller than typical *caffer*, proportionately shorter and

broader, being obovate rather than oval; apex less depressed; dark brown.

Length 4.5, width 3.5, alt. 1.75 mm.

Type locality: Karkloof stream, Natal (Toynton). Also: Maritzburg, Natal (Ponsonby).

Type, No. 36002, coll. Walker.

Var. *gordonensis* Melv. and Pons.

1903. *Ancylus* (*Ferrissia*) *gordonensis* M. and P., A. M. N. H., xii, p. 606, pl. xxxi, fig. 2.

Type locality: Gordon Falls, near Pietermaritzburg, Natal. Also, Edendale Falls, Umzindusi River; Howick Falls, Umgeni River; Nottingham Road; Town Bush Valley stream, Maritzburg; Sweetwater stream near Maritzburg; Aarvogel Krantz, Umgeni River; Dargle, Umgeni system (Burnup); Karkloof stream (Burnup and Morton) and Umgeni River, Natal (Ponsonby); Zoutspansberg, Transvaal (Cragoe).

Var. *farquhari* n. v.

Much smaller than typical *gordonensis*, to which it is most closely allied; thicker and darker; apex more prominent, but scarcely at all depressed.

Length 4.8, width 3.75, alt. 2 mm.

Type locality: York, East Griqualand (Farquhar). Also, Teko River, Transki (Hickey).

Type, No. 36003, coll. Walker.

Var. *stenochorias* Melv. and Pons.

1903. *Ancylus* (*Ferrissia*) *stenochorias* M. and P., A. M. N. H., xii, p. 607, pl. xxxi, fig. 1.

1853.? *Ancylus obliquus* Krauss, in Kuster Con. Cab., Ancylus, pl. 1, figs. 18–20, *non* Brod. and Sby., 1832.

1882.? *Ancylus caffer* Clessin, Con. Cab., Ancylus, p. 36, pl. 1, figs. 18–20.

1889.? *Ancylus caffer* Morelet, J. de Con., xxvii, p. 20.

Type locality: Ebb en Vloed, Port Elizabeth, Cape Colony. Also, Van Staden's River and Bog Farm, Port Elizabeth (Ponsonby); Bakken's River, Port Elizabeth (Farquhar); Upper Retreat and Klipplatz River, Cathcart (Ponsonby); Kaiser River, Montagu (Connolly); King William's Town Road Dam and Kowie River, Grahamstown (Farquhar).

Var. *capensis* n. v.

Shell rather thin, translucent, oval, brownish horn color, darker on the apex; surface with fine, regular growth-lines and very fine, close, somewhat irregular radial striæ; apex prominent, subacute, strongly turned to the right, but not much deflected except at the extreme tip; anterior slope convex, somewhat flattened towards the apex; posterior slope concave; right slope convex; left slightly concave.

Length 7.5, width 4.5, alt. 2.5 mm.

Type locality: Lakeside, Cape Peninsula (Connolly). Also, Hoot Bay, Cape Peninsula (Connolly); Woost Hill River and Blaukrantz River, Grahamstown (Farquhar).

Type, No. 36004, coll. Walker.

Var. *trapezoideus* O. Bœttger.

1907. *Ancylus trapezoideus* O. Bœttg., in Schultze, "Aus Namaland und Kalahari," p. 708,

1910. *Ancylus trapezoideus* O. Bœttg., Abh. Senckenb. Naturf. Ges., Frankfurt, xxxii, p. 45, pl. 28, fig. 15.

1897.? *Ancylus caffer*, v. Mts., Beschalte, p. 151, pl. 1, fig. 19a, c and d.

Type locality: Witkop, British Bechuanaland. Sub-fossil. Also, Pretoria (McBean); Pretoria District (Connolly); Valsch River, Lindley, Orange Free State (Connolly); Crocodile Drift, Transvaal (Connolly); Zoutspansberg, Transvaal (Cragoe); ? Bach Tararo, Umdussuma (Stuhlmann).

II. *Ancylus mooiensis* n. sp.

Shell slightly obovate, the greatest width being in front of the center; thin, translucent, shining, light horn-color; surface with regular, but very fine, growth-lines and exceedingly delicate, wavy, radial striæ; apex about half-way between the center and the posterior margin, subacute, not prominent, but slightly turned to the right and very little deflected; anterior slope convex, but flattened above and nearly straight as it approaches the anterior margin; posterior slope long and regularly, but not deeply, concave; right slope slightly convex; left nearly straight, slightly concave about half-way down.

Length 6.25, width 3, alt. 2.5 mm.

Type locality: Mooi River, Potschefstroom, Transvaal (Livingston).

Type, No. 36005, coll. Walker.

Var. *dubiosus* n. v.

Shell narrower; apex more obtuse, less prominent and decidedly turned to the right.

Type locality: Pienaars Poort near Pretoria (Connolly). Also, Woost Hill River. Grahamstown (Farquhar).

Type, No. 36006, coll. Walker.

III. *Ancylus transvaelensis* Craven.

1880. *Ancylus transvaalensis* Craven, P. Z. S., London, 1880, p. 617, pl. lvii, fig. 11.

1907.? *Ancylus (Ferrissia) stenochorias* O. Boettger, in Schultze, "Aus Namaland und Kalahari," p. 708.

1910.? *Ancylus (Ferrissia) stenochorias* O. Boettger, Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii, p. 450.

Type locality: Mooi River, Transvaal (Craven). Also, Pretoria District, Transvaal (Connolly); Vereeniging, Orange Free State (Johnson); Prieske, Orange River system, Cape Colony (Ponsonby);? Witkop, British Bechuanaland (Boettger).

IV. *Ancylus verreauxii* Bourguignat.

1853. *Ancylus verreauxii* Bgt., Rev. et Mag. de Zool., 1853, p. 351.
1854. Bgt., *ibid.*, 1854, pl. 1, fig. 1.
1856. Bgt., Amen. Mal., p. 12, pl. 1, fig. 1.
1882. Clessin, Con. Cab., Ancylus, p. 60, pl. 5, fig. 4.

1862. *Ancylus verreauxii* Bgt., Spicil. Mal., p. 194.

Type locality: "Ville de Constance," Cape of Good Hope. Also, Retreat, Cape Peninsula (Connolly).

Section *Ferrissia* Walker, 1903.

Ferrissia Walker, NAUTILUS, XVII, p. 15.

Type, *Ancylus rivularis* Say.

V. *Ancylus burnupi* n. sp.

Shell small, depressed, long oval, lateral margins nearly parallel, only slightly convex, the left more than the right, anterior margin

regularly rounded, posterior margin more or less obliquely truncated on the right side; very thin, diaphanus, translucent, white, shining, polished; lines of growth regular, but minute; anterior surface with faint, irregular, radial ripples; apex about half way between the center and posterior margin, obtuse, scarcely projecting and slightly turned to the right; anterior slope but slightly convex; posterior nearly straight; a little concave in the center; right slope slightly convex; left nearly straight.

Length 4; width 2.2; alt. 1 mm.

Type locality: Equeefa River, Natal (Burnup). Also, Brack Kloof River, Grahamstown, Cape Colony (Farquhar).

Type, No. 36007, coll. Walker.

VI. *Ancylus connollyi* n. sp.

Shell small, subconical, oval, lateral margins nearly parallel, the left slightly more convex, anterior and posterior margins regularly rounded; thin; translucent, light horn-color, almost white; growth-lines fine, rather irregular, anterior surface somewhat wrinkled transversely; apex about one-fifth from the posterior margin, obtuse, prominent, slightly turned to the right; anterior alone slightly convex; posterior slightly concave, nearly straight; lateral slopes nearly straight, the right a little convex.

Length 3.75; width 2.2; alt. 1.5 mm.

Type locality: Black River, Maitland, Cape Colony (Connolly). Also, King William's Town Road Dam, Grahamstown, Cape Colony (Farquhar).

Type, No. 36008, coll. Walker.

VII. *Ancylus equeefensis* n. sp.

Shell small, depressed, oval, the left margin slightly more curved than the right; anterior and posterior margins regularly rounded; thin, light horn-color; lines of growth fine and regular; apex close to posterior margin, very obtuse, but not prominent, distinctly turned to the right; anterior slope straight, except as it slightly curves towards the apex, posterior nearly straight from below the apex for two-thirds of its length, thence oblique to the margin; right slope slightly convex; left a little concave.

Length 3.75; width 2.1; alt. 1 mm.

Type locality: Equeefa River, Natal (Burnup).

Type, No. 36009, coll. Walker.

VIII. *Ancylus fontinalis* n. sp.

Shell small, depressed, long, oval, narrow, lateral margins parallel and nearly straight, anterior margin regularly rounded, posterior margin slightly truncated on the right side; thin, white; growth-lines very fine and regular; apex about half-way between the center and the posterior margin, rounded, obtuse, quite prominent, only slightly turned to the right; anterior slope long and nearly straight; posterior slope oblique, straight from the base of the apex to the margin, lateral slopes oblique, nearly straight, slightly incurved towards the margin.

Length 3.25, width 1.8, alt. 0.8 mm.

Type locality: Ranjesfontein, Pretoria District (Connolly). Also, Morgendal, Orange River Colony and Pienaars Poort, Pretoria (Connolly).

Type, No. 36010, coll. Walker.

IX. *Ancylus victoriensis* n. sp.

Shell minute, rather narrow, slightly obovate, the greatest width being at the anterior third of the length, anterior and posterior margins regularly rounded, lateral margins slightly curved, the left more than the right; thin; light greenish horn-color; lines of growth rather coarse and irregular, more or less rippled on the anterior slope; apex posterior, large, prominent, obtuse, scarcely, if at all, turned to the right; anterior slope very convex; posterior slope very short, nearly straight and scarcely oblique; lateral slopes about equally convex, the apex being in the longitudinal axis of the shell.

Length 2.25, width 1.5, alt. 0.75 mm.

Type locality: Victoria Falls, Zambesi River (Connolly).

Type, No. 36011, coll. Walker.

X. *Ancylus zambesiensis* n. sp.

Shell minute, subdepressed, short oval, anterior and posterior margins broadly rounded, lateral margins about equally curved; light greenish horn-color; surface with lines of growth distinct and irregularly rippled on the anterior slope; apex rather prominent, obtuse, in the longitudinal axis of the shell and not perceptibly turned to the right; anterior slope slightly convex; posterior slope oblique and straight; lateral slopes oblique and only slightly convex.

Length 2.25; width 1.6; alt. 0.75 mm.

Type locality: Victoria Falls, Zambesi River (Connolly).

Type, No. 36012, coll. Walker.

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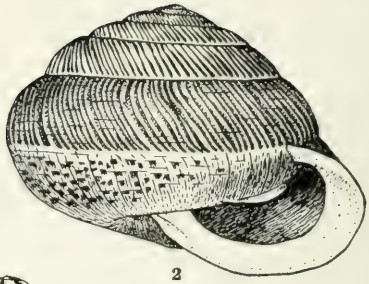

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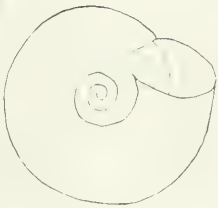

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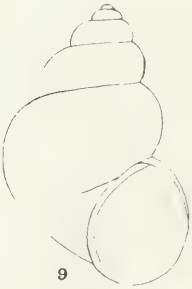

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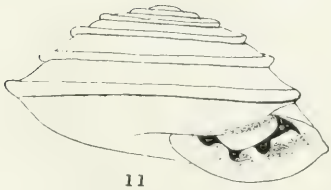

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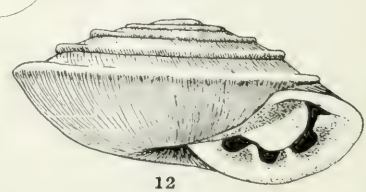

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1, 2. POLYGYRA CLARKII BRADLEYI VAN. (VOL. XXV, p. 120).
3, 4. ALDRICH & PILSBRY: A NEW PLIOCENE NERITINA.
5, 6. THYSANOPHORA COCKERELLÆ PILSBRY.
7, 8. HINKLEY: ON ANCULOSA.
9, 10. AMNICOLA WINKLEYI PILSBRY.
11, 12. ASHMUNELLA FERRISSI PILS. ARIZONA.

THE NAUTILUS.

VOL. XXVI. MAY, 1912. No. 1

A NEW SPECIES OF AMNICOLA.

BY H. A. PILSBRY.

AMNICOLA WINKLEYI, n. sp, Plate I, figs. 9, 10.

The shell is umbilicate, ovate-conic, composed of 4½ to nearly 5 strongly convex whorls, separated by a very deep suture; whitish corneous when cleaned of the thin brown stain, glossy, faintly striate; apex rather acute, aperture ovate, nearly vertical; peristome continuous, a little flattened where it is very shortly in contact with the proceeding whorl.

Length 4.8, diam. 3.1 mm.; length of aperture 2.2 mm.

Saco, Maine.

By its dentition this species belongs to the group of *Amnicola lustrica* Pils., the shape of the central tooth and its denticulation being quite unlike *A. limosa*. It differs from *limosa* by its projecting first whorl, that of *limosa* being flat on top. *A lustrica* is smaller and more slender. *A schrökingeri* Ffld. is closely related but is a very much smaller species. Frauenfeld gives the length as 3.15 mm., and the largest in a series of over 100 before me is 3.2 mm. long, with 4½ whorls.

A. winkleyi has some resemblance to *A.* (*Cincinnatia*) *cincinnaticensis* Anth. by its acute apex and very convex whorls, but it is less solid, and differs very widely in dentition.

This species is one of the fruits of the careful examination of the New England fauna by the Rev. Henry W. Winkley, during the past decade or more. Doubtless the species exists in many collections under one name or another. My attention was called to it in the course of a study of the northern species for a monograph of the New York fauna.

A DAY'S COLLECTING AT ANTILLA, CUBA.

JOHN B. HENDERSON, JR.

The very new little town of Antilla, at the head of Nipe Bay, Cuba, is a very unlikely looking place for land-shells. Off in the distance are fine ranges of high mountains that beckon to the collector, but the few hills near Antilla are low and seem always to be surrounded by mangrove swamps and therefore quite inaccessible. In the hopes of finding something we turned to the only approachable hill, one lying just at the edge of the town. It is a wretched little apology for a hill, without rocks or any good feature for the collector other than a somewhat vigorous crown of vegetation. Arrived at the spot we found the place most uninviting. Goats, pigs, chickens and the whole assortment of Cuba's domesticated fauna ranged the woods, and a very dead horse sent clear to Heaven a protest against our invasion.

But no collector of land-shells happening along Antilla way should neglect devoting an hour or so to these goat-infested woods, for right there live in reasonable abundance the finest *Polymita muscarum* that ever came out of Cuba. Practically all the color varieties known of that really exquisite arboreal snail appear to live there. They range from black (with one orange band) through the yellows and reds (generally brilliantly painted in bands) to the pure china-ware glazed white. One would naturally suppose that so bright a color spot on a tree as this shell presents would be most easily detected. When once seen it certainly looks easy enough, yet I feel sure that we collected but a small proportion of the inhabitants. The reason is that the snail usually hides in the crotch of a limb, or fastens itself to the trunk of shrub or tree at just the spot where a convenient leaf covers him. The best manner of stalking them is to look along the ground for "bones" and when a "cemetery" is found then turn the eyes upward to the vegetation, for these creatures seem to have a gregarious habit and live in colonies. This may not be true in the rainy season when all tropical snails are more active.

From this little wooded hill we took besides the *muscarum* some very fine *Cepolis alauda* Fer. of the more typical form than is usually seen in collections. This is also a tree snail with much the same habit as the *muscarum* but they do not affect the colonial mode of life as definitely, and they are less shy in exposing themselves on

the tree to full view of the eager collector. The great range of variation in this species, not only in color but in size and form causes one to wonder if there are not possibly several distinct species included in the one comprehensive name of "alauda." There is also there, in these woods, but rather sparingly, *Pleurodonte marginella* Gmel. of a very dark color form. These also live on the trees, but only on the large trees and then invariably on the trunks. They look just like great big buttons and may be detected a hundred feet away. On the ground, quite common, were *Pleurodonte auricoma provisoria* Pfr. and a Helicina that we may call, for the present, *submarginata* Gray, also, *Oleacina subulata* Pfr. On the tree trunks, low down near the ground, very strictly of social habit, were *Macroceramus pictus* (Gundl.) Pfr. and, more commonly distributed, the *Chondropoma revinctum* Poey.

We answered the call of the more distant mountains later and I would like to tell of that trip when I shall have had time to identify the material collected. That is up in the "picta" country. I know of nothing more wonderful for jaded nerves and "that tired feeling" than to range the woods and banana fields for *Polymita picta.*

NOTES ON CIRCINARIA CONCAVA (SAY) FROM SHEBOYGAN COUNTY, MICHIGAN.

BY H. BURRINGTON BAKER.

Circinaria concava was considered to be a typical shell of the Upper Austral, and in the southern peninsula of Michigan was not known to extend much farther north than the old Saginaw-Grand River outlet. In consequence, it was a surprise to find it last summer near the north shore of Burt Lake, Cheboygan County, about one-hundred and fifty miles north of this line. Even more peculiar, however, was its habitat, as it was living in and along the edge of a large, boreal, cedar-spruce-fir (*Thuja-Picea-Abies*) bog, along with such a typically boreal species as *Pyramidula asteriscus* (Morse).

A quite thorough search of the hardwoods and other transition habitats of the region failed to reveal this shell, so it appears we have an *austral* shell living in a *boreal* bog in a *transition* region. One is tempted to conclude that this species, weakened by living too far north, is unable to cope with its competitors in the more favor-

able habitats, and is, for that reason, restricted to the unfavorable, sparsely populated, boreal bog, just as the boreal plants and animals are confined to these relict islands throughout the transition and the northern parts of the Upper Austral zones. These rivals would probably not be other shells in the case under consideration, as *Circinaria* is the only snail in the region that is mainly carnivorous in habits, but would probably be some of the carnivorous arthropods.

The shells themselves show the influence of poor conditions as they are, thin, fragile, and dwarfed. The largest specimen collected, which was a shell of four and one-half whorls measures: greater diameter 11.9 mm., lesser diameter 10.4 mm., altitude 5.3 mm., while a shell with five whorls from southern Michigan measures: 18.9 mm., 16 mm., 8.5 mm.; and a young shell of four and one-half whorls from the same region as the latter: 13.9 mm., 11.8 mm., 6.4 mm. This difference in size is even more marked in the embryonic first whorl, and the northern shells are more transparent and vitreous than the southern, have little of the latter's clouded, milky appearance, and truly resemble in texture an over-grown *Vitrea*. In addition, the revolving, microscopic wrinkles, which mark the typical shells over the entire upper surface but most strongly along the inner, sutural slope of each whorl, are more delicately and strongly marked in the northern form.

The question as to how this form got into this region is, at present, unanswerable, but the fact that the bog, in which it was found, lies between the Nipissing fossil beach and the present shore of Burt Lake is at least interesting in this connection.

RUMINA DECOLLATA IN MOBILE AND NEW ORLEANS.

BY. HERBERT H. SMITH.

This species is common in Southern Europe and has been carried by commerce to Bermuda, Havana and other places. As far as I know, the only recorded North American locality is Charleston, S. C., where it has been fully naturalized for many years. For its discovery in Mobile and New Orleans we are indebted to Mr. L. H. McNeill, of the former city. This gentleman sent to me a drawing of the shell, stating that he had first noticed it in New Orleans as

early as 1907,[1] and subsequently found it common in Mobile. Mr. McNeill is interested in shells and had collected them with the late Dr. Charles Mohr : he did not remember seeing this species in the Mohr cabinet or elsewhere, and asked me for information. The drawing, though he apologized for it, was so good as to leave little doubt in my mind ; moreover, Mr. McNeill stated that the shells were always decollate ; and, from their occurrence in the older or French parts of the two cities, he believed them to be introduced.

At my request he took the trouble to gather and forward more than 100 living specimens ; and a few days after, he sent some dead but good shells which he had brought from New Orleans. These are like Charleston or Bordeaux specimens. Mr. McNeill's notes are so good that I gladly transcribe them :

" The Mobile specimens were gathered at the S. E. corner of Monroe and Royal Sts. Another location is the S. E. corner of St. Emanuel and Canal Sts. Both are in the oldest parts of the town, and the first on the site of old Fort Charlotte (Fort Conde of the French ;) there were dozens of them crawling across the sidewalk, it being a damp and cloudy day, and many had been crushed by pedestrians. The shell is found over quite a large area of the city."

With regard to the New Orleans specimens he writes : " I noticed them first while putting up a building on the uptown side of Jackson Ave., two doors towards the river from Prytania St., and afterwards in other locations, including Girod and Claiborne Cemeteries. I also saw a gardener destroying several of them, remarking that they were a pest among the violets, which suggests that they are well known all over the city."

These exact locality notes are interesting. In Mobile, at least, the snail appears to be common only in the older or French streets, and probably that is why so large a species has been overlooked by Mohr, Showalter and other good collectors. During a recent brief visit, I collected in vacant lots where rubbish piles, stones, etc., gave plenty of shelter : snails were much in evidence, but no Rumina was seen. I was not looking for it, not knowing, at the time, that it lived in the city ; but I could hardly have missed so large a species had it been at all common. These lots were in newer parts of the

[1] After this was written and sent to press I learned that Mr. Ferriss collected *Rumina* at New Orleans, some years ago. As far as I know the fact was not published.

city, a mile or more from the French streets. Probably the species, though fully naturalized, has not extended its range so far.

All the indications are that Rumina was introduced in Mobile a century or more ago, during the French rule, and in all probability it was brought from some French port. The New Orleans race may be as old or older; both cities date from the 17th century. I shall not be at all surprised if Rumina turns up in Pensacola, another old colony; and it is more than probable that other European species may be found in these Southern cities.

SPHAERIIDAE, OLD AND NEW.

BY V. STERKI.

A revision, or monograph, of the North American *Sphæriidæ* has been demanded for years. But the way is not clear: very much is yet to be learned with respect to many species, their interrelations, the extent of their variation, and their distribution. A great deal of material for study from all over the continent is still desirable. A catalogue of the known species, with some notes will be published soon, and on the following pages will be found some descriptions and rectifications.—The numbers cited are those of the special collection of *Sphæriidæ*.

Piridium abditum Haldeman, Proc. Acad. Phila., I. p. 53, 1841; Prime, Mon. Corb. 1865, p. 68.—The *P. abditum* muddle has been the greatest stumbling block in the otherwise difficult study of *Pisidium*. Beginning with T. Prime, this "species" has been the general dumping ground into which almost anything was thrown that was not plainly "a black bass or a snapping turtle," or to remain serious, any *Pisidium*, even such as *noveboracense*, *variabile*, *æquilaterale*, *compressum*, etc.. and occasionally *Sph. occidentale*.

The authentic specimens, from Lancaster Co., Pa., in the T. Prime collection[1] are of a rather small form but serve to define the

[1] They had been there for about seventy years, and remained covered with a ferruginous crust so that their real shape, surface sculpture and color could not be seen. Now they are clean. Of the seven, five are immature, of a rather small form, as noted, 2.8–3.3 mm. long, the others, two pair of valves, are 3.8-4 mm. long. The description, in Mon. Corb., is quite inadequate, even with respect to the original form: "very inequilateral" [should be inequi-

species, which is really widely distributed, common and very variable, even if restricted after eliminating the three following species and some others which are clearly distinct.

The mussels of the typical and near-typical forms average larger and more inflated. It appears that there are several geographical subspecies; the following is one of them:

P. abditum subrotundum St. (*P. subrotundum*, The Nautilus XX, p. 19, 1906) The mussel is less inflated than in *abditum*, averaging smaller, the beaks are broader and less elevated; rather uniform. Appears to be a northern form; New England to Ontario, Michigan and northern Ohio.

P. minus (Ad.), *Cyclas minor* Ad., Proc. Boston Soc. N. H. I, p. 48, 1841; ranged under the syn. of *P. abditum* by Prime, Mon. Corb., p. 68. Is distinct so far as can be judged from the authentic specimens (3 valves, from Waybridge, Vt.) in the T. Prime collection, but appears to be rather rare. Specimens fairly well agreeing with them have been seen from: Duxbury, Mass. (W. F. Clapp, No. 6969); Denisville, Me. (Dr. Jas. Lewis' collection, now Mr. Bryant Walkers' No. 2582); Klinger's Lake, St. Joseph Co. Mich. (B. Walker, 6846); Ann Arbor, Mich. (H. E. Sargent, No. 3099, none full-grown); Cowley Farm, Nepean, Ont. (Justice F. R. Latchford, No. 6929), and apparently Greenport, L. I, N. Y. (J. B. Henderson from Sanderson Smith, No. 675).

P. regulare Pme., Boston Journ. VI, p. 363, pl. XII, figs. 11, 12, 1852. Also arranged under the synonymy of *P. abditum*, in Mon. Corb., l. c.; certainly not a form of *abditum*, to judge from the single specimen from "Ohio" in the Prime collection, ranging nearer *P. noveboracense* Pme., but appears to be distinct. Specimens identical were collected near Douglas Lake, Cheboygan County, Michigan, 1911, by Mr. H. B. Baker, Nos. 7084 and 7085, and probably the same near Geauga Lake, southeast of Cleveland, Ohio, by Mr. John A. Allen, 1910, No. 6542. Others were seen before but not recognized.

partite]: generally not so, and the figure shows rather the contrary and, by the way, has the beaks too high and otherwise faulty; "generally light straw color" is exceptional: generally light to dark corneous, often yellowish "cardinal teeth separate" is meaningless; "long. 0.15, lat. [= alt.] 0.14: diam. 0.09 inches" does not agree with "shell elongated," and with the figure "The surface is at times also quite rough and the striæ coarse"—conf. with; "the exterior surface is much smoother" (than in *P. noveboracense*).

Pisidium sphæricum, n. sp.—Mussel very inequipartite, strongly inflated, nearly globular; superior margin nearly straight, short, posterior subtruncate, the others rounded, supero-anterior slope barely marked; beaks near the posterior end, high, prominent over the hinge margin, rounded; scutum and scutellum distinctly marked; surface dull to slightly glossy, with fine, irregular striæ and a few lines of growth, color yellowish to grayish corneous, lighter along the margins, often with brown to blackish mottlings, whitish to straw in the young; shell rather strong, posterior muscle scars and pallial lines distinct; hinge stout, curved, cardinal teeth rather small, the right angular, with the posterior part thicker and grooved, the left anterior short, abrupt, angular, the posterior steeply oblique, little curved; ligament strong. Soft parts not examined.

Long. 5.6, alt. 5.3, diam. 4.6 mm. (100 : 95 : 82).

Long. 4.8, alt. 4. diam. 3.4 mm. (100 : 84 : 71).

Hab.; New England to Virginia, Ontario and Wisconsin (?): Westbrook, Me., collected by Prof. A. H. Norton; Saco, Me., Danvers and Lynnfield, Mass., by the Rev. H. W. Winkley; George R. North, Warren, Knox, Co., Me., by N. W. Fermond: Cambridge and Woburn, Mass., by Wm. F. Clapp.; Va. oppos. Washington, D. C., Sterki; Unalitoulin Id., Ont., by Justice F. R. Latchford; Fox River, Wis., by Geo. T. Marston, sent by E. W. Roper (if no label was misplaced; one of the two specimens in the collection is true, the other is a *P. abditum*).

Types: No. 797, Westbrook Me., for full-grown specimens, No. 727 Saco Me., and 6641, Lynnfield, Mass., for juv. and adolescent of a smaller form; yet anyone of the lots in the collection might serve as types.

This very distinct and characteristic *Pisidium* has been known for many years, but unfortunately much misunderstood and ill-treated. Generally it has been taken for a form of *abditum;* the late E. W. Roper named it *adamsi*, and under that name, specimens are in various collections; I have named it *P. minus*, having seen two specimens under that name, in a collection, but from that species it is also distinct, as evidenced by authentic specimens of *minus*.—From larger forms of *abditum* it is easily distinguished by the large and prominent beaks situated close to the posterior end of the mussel, and the strong hinge. In the young, the superior and supero-anterior margins form a peculiar somewhat angular curve, much as

in the young of *P. compressum* Pme.—It cannot be mistaken for any other species.

Pisidium alleni, n. sp.—Mussel rather large, well inflated, oval to ovoid in outline, without any projecting angles, beaks slightly behind the middle, large, prominent, rounded; scutum and scutellum slightly marked, small; surface shiny, with irregular striæ and several (4–6) strongly-marked lines of growth, color straw to light yellowish, plumbeous around the beaks in old specimens; shell and hinge medium strong, the latter rather long, cardinal teeth placed on the upper part of the hinge plates, the right angular with the posterior part thicker and grooved, left anterior short, pointed, the posterior oblique, rather long, nearly straight, ligament strong.

Long. 6.2, alt. 5, diam. 3.8 mm. (100 : 81 : 61). Half-grown specimens are rather different in shape, somewhat oblique, moderately inflated, posterior margin subtruncate, beaks markedly low and broad, apparently more posterior; young mussels are very flat.

Hab.—New England, New York; Hebron and Buckfield, Oxford county, Me., collected by Mr. John A. Allen; Franklin county, Me., by Mr. N. W. Lermond; "N. H." in the collection of Dr. James Lewis (B. Walker's), and that of the Cincinnati Soc. N. H.; Clifton, Staten Island, N. Y., Mr. J. B. Henderson, from Sanderson Smith. Types No. 5871a from Hebron, Me.

The only species to which this has resemblance is *roperi* St., which is much smaller, with shell and hinge slighter, and half-grown specimens not so oblique, and markedly constant over a wide territory. I take pleasure in naming the species in honor of Mr. J. A. Allen, who has done much good collecting in New England and Ohio.

(*To be continued.*)

OREOHELIX COLONIES IN COLORADO.

BY JUNIUS HENDERSON.

(*Concluded from Vol. XXV, p. 139*)

OREOHELIX COOPERI (W. G. B.)

Where the formations were badly cut up by igneous intrusions and displaced by folds and faults, in the neighborhood of Rabbit Ears, and elsewhere, attention was sometimes called to the existence of the calcareous formations in unexpected places by the presence of

numerous dead snail shells lying on the soil-covered surface. The species is very abundant about nine miles east of Meeker, on a Lower Mancos shale slope, with *gabbiana*. We have but one reversed specimen of the species.

These records show that *cooperi* is much more generally distributed than any other *Oreohelix* in Colorado, with its variety *minor* a close second, and *depressa* third.

Oreohelix cooperi minor Ckll.

I recently found dead shells very abundant, including one reversed specimen, on the exceedingly dry slopes of a gulch where the red Carboniferous sandstones were almost barren of soil and vegetation, except dwarf cedar and pinyon pine, altitude 7,200 feet. There are thin limestone bands in the formation. By 15 minutes' search 37 live ones were obtained, the majority being, to my surprise, under a small pinyon log and the cones which had lodged against it, the balance two or three at a time under small cedar logs. This form also occurs on a similar slope about two miles distant, and I found no other species of *Oreohelix* there. A few were found on a steep Niobrara slope southeast of Sulphur Springs. A very fine colony occurs on a steep, rather dry terrace south of White River, about two miles southeast of Meeker, under *Amelanchier*, etc., and another four miles southwest of Meeker. These were by no means as unfavorable localities as the McCoy and Sulphur Springs colonies of *minor* occupy, and seemed much better suited to snail life than the flourishing Muddy Creek colony of *cooperi*, and as well suited as the big *depressa-cooperi* colony at Steamboat Springs. My first impression was that perhaps *minor* was merely an ecological form of *cooperi*, dwarfed by unfavorable environment, but more careful consideration of the facts of distribution and an examination of our large series of both, seem to render that supposition untenable. Four dead specimens are from Placerville, San Miguel county, and twelve from Montrose, were collected by Mr. E. R. Warren, the well-known mammalogist. We have a lot from near Ohio City, Colo. (Frank Rohwer), and ten dead ones from Johnson county, Wyoming (N. DeW. Betts). This form has been likened to *O. s. concentrata* Dall (Nautilus, XVI, 106–107), but I have compared it with authentic *concentrata* received from Dr. Dall and find it quite distinct. I should say that *minor* is a dwarf variety of *cooperi* and *concentrata* perhaps a dwarf form of *depressa* type.

The Ohio City specimens were abundant at 11,000 feet, just above timber line, near a snow bank. That it was not a case of dwarfing of specimens of *cooperi* on account of lack of moisture or low temperature is indicated by the fact that *O. s. depressa* at that and higher altitudes seems at its best.

OREOHELIX HAYDENI (Gabb).

The only place in Colorado from which this species has been received is Glenwood Springs, where it was found alive in such abundance by Bethel and Dakan, and some fossil specimens collected near there. I see no reason for Binney's conclusion that it is only a variety of *strigosa.*

OREOHELIX HAYDENI GABBIANA (Hemphill).

In the Glenwood Springs colony hereinbefore described there is some tendency to intergrade with *haydeni*, and the sculpture of the embryonic whorls further indicates a close relationship. Dakan found another astonishing colony near Newcastle, from which he brought over 1,000 very fine adult specimens collected alive in a few moments. I found them more sparingly at another point near there, on Lower Mancos shales. Nine miles east of Meeker I found a colony on Lower Mancos shales, where they were mingled with *cooperi* in about equal proportions. It was raining, and the snails were crawling about under the bushes by the hundreds.

OREOHELIX HENDERSONI Pilsbry.

Known only from the type locality, where dead shells were collected three years ago by Mr. A. Dakan, on Little Thompson Creek, ten miles northwest of Longmont, on a talus slope of Niobrara limestone. Dr. Pilsbry considered it new, so I asked Mr. Dakan to search for live ones. Last July, during better snail weather, he returned to the place and had no difficulty in getting 160 live ones and many more dead ones. He says "it appears to be a small, healthy colony."

NOTES ON SHELLS FROM QUIRIGUA, GUATEMALA.

BY HENRY A. PILSBRY.

In the course of a recent visit to Guatemala, chiefly for studying insects, Mrs. T. D. A. Cockerell collected the following snails, all from Quirigua.

Aperostoma dysoni (Pfr.)
Ampullaria sp. (young).
Helicina amœna Pfr.
Thysanophora plagioptycha (Shuttl.)
Thysanophora cockerellæ n. sp.
Opeas micra (Orb.)
Euglandina cumingi (Beck.)
Cæcilioides consobrina veracruzensis (C. and F.)
Succinea sp. (immature).
Aplexa princeps Phillips.

THYSANOPHORA COCKERELLÆ n. sp. Pl. I, figs. 5, 6.

Related to *T. conspurcatella, hornii* etc. The spire is conic, composed of nearly $4\frac{1}{2}$ very strongly convex whorls united by a very deep suture, the last whorl regularly rounded, rather coarsely striate. Umbilicus contained $3\frac{1}{4}$ times in the diameter. Aperture subcircular, about one-fifth of the circumference occupied by the preceding whorl.

Alt. 2.4, diam. 3.4 mm.

Quirigua, Guatemala, W. P. Cockerell, 1912.

The spire is decidedly higher than in *T. conspurcatella* Morel. It is nearer *T. proxima* Pils., from the state of Michoacan which agrees in size of umbilicus, but the spire is higher in *T. cockerellæ*. *T. fischeri* Pils. is a more delicate shell with narrow umbilicus. Seven specimens were collected, the largest being measured above and figured. Most of the lot are decidely smaller with 4 whorls. The surface is not in good condition, but will probably prove to have cuticular processes like those of the related species mentioned.

It is named for Mrs. Cockerell.

NOTES.

BERMUDA SHELLS.—Mr. Arthur Haycock presented to the Academy of Natural Sciences of Philadelphia a set of shells from Whitby Cave, Bermuda, including *Strobilops hubbardi* Br., *Zonitoides bristoli* Gul., *Thysanophora hypolepta* Shutt., *Bifidaria rupicola* Say, and *Striatura milium meridionalis* Pils. The *Striatura* is new to the Bermuda fauna.—E. G. VANATTA.

ERRATA.—February number, page 110, end of sixteenth line from bottom, for " the rows " read *two rows*.

The Nautilus.

Vol. XXVI. JUNE, 1912. No. 2

CUMBERLANDIA, A NEW GENUS OF NAIADES.

BY A. E. ORTMANN.

The type-species of this new genus is *Unio monodonta* of Say, which stands, in Simpson's system (Pr. U. S. Mus. 22, 1900 p 679) as *Margaritana monodonta* (Say).

As Simpson has correctly recognized, this species has affinity with the genus *Margaritana* (Type: *margaritifera* Linnaeus), and, consequently belongs to my family *Margaritanidæ* (Nautilus, 25, 1911 p. 129). Through the courtesy of Mr. Bryant Walker I had the opportunity to examine the soft parts of a number of individuals from the Cumberland River, and was able to ascertain that all essential characters given by me for this family are present, chiefly so the conformation of the diaphragm, of the posterior end of the gills, and of the anal and branchial openings. But there is one interesting difference. While in other species of the genus *Margaritana* the interlaminar connections of the gills are scattered, and irregularly distributed, or fall into more or less distinct oblique rows, in the present species these irregular, interrupted rows are *developed as continuous septa, which run obliquely forwards.* In the middle of the gills, these septa are well developed and quite continuous, but rather distant from each other. Toward the ends of the gills they are more irregular, shorter, and chiefly at the posterior end they are somewhat interrupted, and thus it is clearly seen that they represent a *further development* of the oblique, interrupted rows present in other species of *Margaritana.*

The septa of this species (*monodonta*) have nothing to do with the septa of the family *Unionidæ*, for in the latter they run parallel to

the gill-filaments while here they cross them obliquely. Moreover, the septa of the *Unionidæ* are much more closely set (chiefly in the females), and much more regular.

Margaritana monodonta differs by this structure markedly from all species of *Margaritana* I know. I have seen the typical *Margaritana*-structure not only in *Margaritana margaritifera* (L.) (both from Europe and northeastern America), but also in two specimens of *Margaritana sinuata* (Lam.) (= *crassa* Simpson, 1, c. p. 678) from near Perpignan, France (sent to me by Mr. W. Israël), and in a number of specimens of *Margaritana hembeli* (Conr.) from southern Alabama (I am obliged to Mr. H. H. Smith for these). While I thus consider these three species as congeneric (the creation of *Pseudunio* for *sinuata* by Haas notwithstanding), *M. monodonta* differs from them in an important structure, which undoubtedly represents a higher specialization, a forward step in evolution, and it is, as I believe, entitled on this account to the rank of a separate genus, which I propose to call Cumberlandia (Type: *monodonta* Say).

As to the distribution of *Cumberlandia monodonta*, Walker's papers should be consulted (Pr. Mal. Soc. 9. 1910 pp. 137–139, and NAUTILUS, 25. 1911 p. 57–58). According to this, the metropolis of it seems to be in the Cumberland and Tennessee Rivers, but it has spread into the lower Ohio drainage, and into Indiana and Illinois. In the Ohio, it was not known, up to the present, above Cincinnati: but I may mention here, that I found last summer (July 13, 1911) a dead specimen of *Cumberlandia monodonta* in the Ohio River at Buffington Island, near Portland, Meigs Co., Ohio. I also may add, that according to the experience gained by my last year's collecting, it is entirely excluded that this species occurs anywhere in the Big Sandy or Great Kanawha Rivers, and that I do not think that it reached its present range by coming "down" the Ohio. But this will be discussed elsewhere.

ADDITION TO THE LIST OF MOLLUSCA FROM MONTE SANO, ALABAMA.

BY. H. E. WHEELER.

Through the kindness of Prof. Herbert H. Smith, conchologically the "discoverer" of Monte Sano, and Mr. George H. Clapp, who

determined the collections from this region, I am able to make the following additions to the list published in the March number of the NAUTILUS for the current year. It should be noted that some of the species listed then and now were not found on the mountain proper, but, living on the foothills or in the adjacent valleys, are entitled to enumeration in the fauna of the region.

Polygyra auriformis, Bld. This and the species *clausa* are low land shells, collected near the base of the mountain.

Polygyra pustuloides, Bld. Near Huntsville, and also on the mountain.

Polygyra tridentata Say. "Common in the whole region, and probably on the table land of the Mountain." Smith.

Polygyra clausa Say.

Polygyra hirsuta Say. Typical *hirsuta* is found on Monte Sano according to Clapp.

Strobilops virgo Pils.

Bifidaria contracta Say.

Bifidaria corticaria Say.

Bifidaria pentodon Say.

Bifidaria pentodon gracilis Sterki.

Bifidaria clappi Sterki. See NAUTILUS, Vol, XXII, pp. 108, 109. Sterki gives Huntsville, Alabama as one of the type localities. Clapp has it also from Monte Sano.

Vertigo milium Gld.

Vertigo rugosula oralis Sterki. "In the Huntsville region, and almost surely from the mountain." (Smith).

Vertigo gouldii Binn.

Cochlicopa lubrica morseana P. From the western part of Vincent Mountain. This is one of the numerous connected spurs of the same mountainous chain, and the species is likely to be found on Monte Sano in suitable situations.

Omphalina pilsbryi Clapp. See NAUTILUS, Vol. XVIII, p. 30. Collected by the writer at Normal, several miles north of Huntsville, Alabama, and by Smith on Monte Sano.

Euconulus chersinus dentatus, Sterki. "More correctly a 'form'; certainly not a variety." (Smith).

Gastrodonta intertexta Binn. Collected by the writer at Huntsville, and by Prof. Smith on the mountain.

Gastrodonta acerra Binn. Huntsville region. Should be found on the mountain.

Punctum blandianum Pils.

Pyramidula cumberlandiana, Lea. Rarely at the southern end of Monte Sano. This record, furnished by Smith, cancels the negative note in previous article.

There is a variety of *Pyramidula alternata*, Say, which is quite constant, distinguished principally by its sub-carinate contour, which was collected on an isolated peak (Ward's Mountain?) three miles south west of Huntsville.

Pyramidula sub-sp. nov. (Pilsbry). A splendid sub-species of *bryanti* which has been described by Dr. Pilsbry, but not yet published. Locality a dry ridge about 6 miles north of Monte Sano.

Succinea avara Say. Reported by Clapp.

Carychium exiguum Say. "Associated with *exile*, H. C. Lea, but rare and local." (Smith).

LAND SHELLS OF SOUTHERN FLORIDA.

BY E. G. VANATTA.

This list is based upon shells picked from leaf-mould collected in Florida by Messrs. Clarence B. Moore, H. A. Pilsbry, C. T. Simpson, Stewardson Brown, H. W. Fowler, and J. S. Raybon.

All are in the collection of the Academy of Natural Sciences.

Many of the specimens of *Truncatella bilabiata* are a rather smooth form parallel to *T. c. succinea* Ad.

The typical *Polygyra cereolus* Mühl. were at first divided by size from the var. *carpenteriana* Bld., but these two forms intergrade as shown by the following count of specimens in a large series from two localities. In a lot from Little Pine Key there are 46 *Polygyra cereolus* measuring from 14.5 to 10.5 mm.; 700 *Polygyra c. carpenteriana* measuring 10.3 to 7.5 mm., and 40 measuring 8.3 to 7 mm. in diameter.

From Big Pine Key at Robert Watson's place there are 12 *P. cereolus* measuring 14.5 to 11 mm. in diameter; 1009 var. *carpenteriana* measuring 11.3 to 9 mm., and 16 from 9 to 7 mm. It will be seen that no definite division can be made. Each of these lots represents a single colony, the snails being scraped up with the dirt, without selection, from under stones in an area of a square rod or two.

The *Bifidaria contracta* from Florida form a race in which the inner portion of the parietal lamella is divided from the forward part by a depression, as if it were another lamina joined to the main one.

In picking them over, one has a tendency to divide each lot of *Bifidaria pellucida hordeacella* from Florida into four forms, figured on plate II, as follows:—form A, *long*, figs. 1, 3, 4, 5, 9, 10, 15; form B, *medium-sized*, figs. 6, 7, 8, 13, 16, 17, 19; form C, *small*, figs. 14, 20, 21, 24, 25, 26, 27, and form D, *obese*, figs. 12, 18, 22. All these forms seem to intergrade in size through a small number of examples. The variation observed is largely due to the formation of a lip when the shells have made a different number of volutions, as the long forms have about 5½ whorls and the short forms only about 4 whorls. It is peculiar that the long shells from Florida have weak teeth and the short specimens have strong teeth; while in Texas the converse is often the case.

To give an idea of the relative abundance of the forms, in a lot of *Bifidaria p. hordeacella* from Bahia Honda Key I counted 25 long, 31 medium, 15 small, and 7 obese shells. In another series from Key West there are 111 long, 358 medium, 22 small, and 140 obese specimens. Each of these lots was from dirt gathered in the area of a square yard or less. The size in mm. of the several forms may be measured by the scale supplied on the plate.

Vertigo variolosa is very scarce, as only four perfect specimens were found. *Helicina tantilla* also continues to be excessively rare. Many other equally small species were obtained by thousands.

For lists of species from other keys visited, see the THE NAUTILUS, xix, 1905, p. 38, and xxi, 1908, p. 99. Altogether over 50,000 specimens have been picked from dirt and débris obtained on the Florida Keys.

BAHIA HONDA KEY, Lee Co., collected by Dr. H. A. Pilsbry.

Chondropoma dentatum Say.
Truncatella bilabiata Pfr.
Truncatella caribæensis succinea Ad.
Thysanophora selenina Gld.
Thysanophora plagioptycha Shutt.
Polygyra cereolus Mühl.
Polygyra cereolus carpenteriana Bld.
Pupoides modicus Gld.
Bifidaria p. hordeacella Pils.

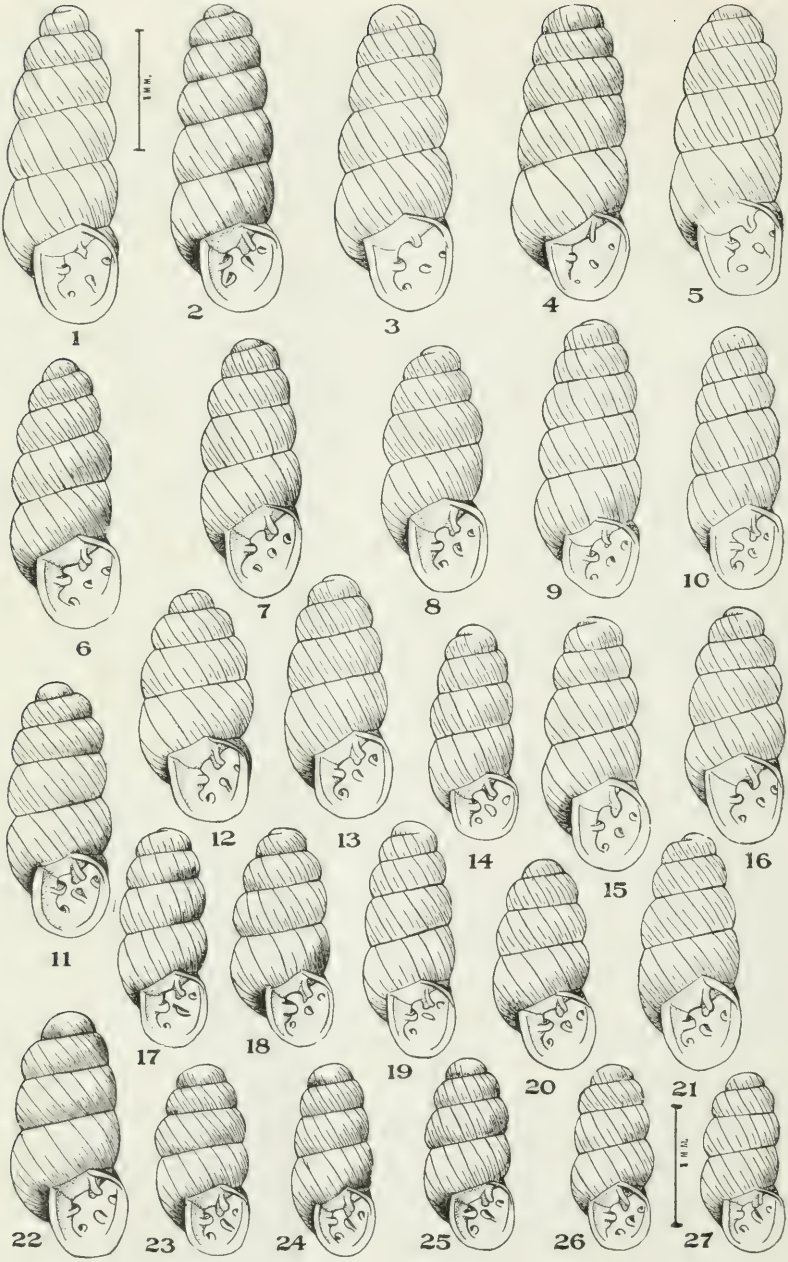
Bifidaria rupicola Say.
Varicella gracillima floridana Pils.

Blue Hill, Horr's Island, Lee Co. (near Key Marco), collected by Clarence B. Moore.
Thysanophora plagioptycha Shutt.
Pupoides modicus Gld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Vertigo variolosa Gld.
Guppya gundlachi Pfr.
Vitrea dalliana 'Simps.' Pils.

Boca Grande Key, Monroe Co., collected by Stewardson Brown and H. W. Fowler.
Drymæus multilineatus Say.
Cerion incanum Binn.
Succinea floridana Pils.

Boca Chica Key, Monroe Co. Collected by Dr. H. A. Pilsbry, C. T. Simpson, S. Brown and H. W. Fowler.
Chondropoma dentatum Say.
Truncatella caribæensis 'Sby' Rve.
Truncatella bilabiata Pfr.
Helicina orbiculata Say.
Helicina orbiculata clappi Pils.
Thysanophora selenina Gld.
Thysanophora incrustata Poey.
Thysanophora plagioptycha Shutt.
Praticolella jejuna Say.
Cerion incanum Binn.
Pupoides modicus Gld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Varicella g. floridana Pils.
Guppya gundlachi Pfr.
Vitrea dalliana 'Simps.' Pils.

Fikahatchee Key, Lee Co. Collected by Clarence B. Moore.
Helicina orbiculata Say.
Helicina o. clappi Pils.
Polygyra c. carpenteriana Bld.



VANATTA: VARIATION OF BIFIDARIA PELLUCIDA HORDEACELLA.

1, 2, 3. UNIO JACKSONIANUS FRIERSON.
4, 5. UNIO PURPURIATUS SAY.
6, 7. VIVIPARUS WALKERI PILS. & JOHNS

Thysanophora selenina Gld.
Thysanophora plagioptycha Shutt.
Pupoides modicus Gld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Bifidaria contracta Say.
Strobilops hubbardi Br.
Euglandina rosea Fer.
Vitrea dalliana 'Simps.' Pils.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Zonitoides singleyana Pils.

A SMALL KEY OPPOSITE FLAMINGO, Monroe Co. Collected by Clarence B. Moore.

Polygyra c. carpenteriana Bld.

GILBERT'S, Lee Co. (near Matanzas Pass). Collected by Clarence B. Moore.

Bifidaria rupicola Say.

GRASS KEY, Monroe Co. Collected by J. S. Raybon.

Truncatella caribæensis 'Sby' Rve.

KEY WEST, Monroe Co. Collected by Dr. H. A. Pilsbry and C. T. Simpson.

Truncatella caribæensis 'Sby.' Rve.
Helicina o. clappi Pils.
Thysanophora incrustata Poey.
Thysanophora plagioptycha Shutt.
Polygyra cereolus Mühlf.
Urocoptis poeyana variegata Pfr.
Microceramus pontificus Gld.
Pupoides modicus Gld.
Bifidaria p. hordeacella Pils.
Opeas gracile Hutt.
Opeas micra Orb.
Euglandina rosea minor Binn.
Varicella g. floridana Pils.
Succinea campestris Say.

LIGNUM VITÆ KEY, Monroe Co. Collected by Clarence B. Moore.

Helicina o. clappi Pils.

Lossman's Key, Monroe County. Collected by Clarence B. Moore.

Helicina orbiculata Say.
Helicina o. clappi Pils.
Thysanophora selenina Gld.
Thysanophora plagioptycha Shutt.
Thysanophora caeca Guppy.
Polygyra cereolus Mühl.
Polygyra c. carpenteriana Bld.
Polygyra septemvolva Say.
Microceramus pontificus Gld.
Strobilops hubbardi Br.
Bifidaria rupicola Say.
Bifidaria contracta Say.
Vitrea indentata Say.
Vitrea dalliana 'Simps.' Pils.
Euconulus chersinus Say.
Guppya gundlachi Pfr.
Zonitoides arborea Say.
Zonitoides minuscula Binn.
Zonitoides minuscula alachuana Dall.
Zonitoides singleyana Pils.

"McIlvaine's Place," on a small key two miles northeast of Marco, Lee Co. Collected by Clarence B. Moore.

Polygyra c. carpenteriana Bld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Bifidaria contracta Say.
Vertigo rugosula oralis St.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Zonitoides singleyana Pils.

Little Marco Key, Lee Co. Collected by Clarence B. Moore.

Microceramus floridanus Pils.

Mormon Key, Monroe Co. Collected by Clarence B. Moore.

Truncatella caribæensis 'Sby.' Rve.
Truncatella bilabiata Pfr.
Polygyra c. carpenteriana Bld.

Nameless key (Mr. Addison's), two miles east of Marco, Lee Co. Collected by Mr. Moore.

Pupoides modicus Gld.

No Name Key, Monroe Co. Collected by Dr. Pilsbry.

Chondropoma dentatum Say.
Helicina o. clappi Pils.
Thysanophora selenina Gld.
Thysanophora incrustata Poey.
Thysanophora plagioptycha Shutt.
Praticolella jejuna Say.
Drymæus multilineatus Say.
Microceramus pontificus Bld.
Cerion incanum Binn.
Strobilops floridanus Pils.
Varicella g. floridana Pils.
Vitrea dalliana 'Simps.' Pils.
Guppya gundlachi Pfr.

Big Palo Alto Key, Dade Co., collected by Clarence B. Moore.

Helicina o. clappi Pils.

Panther Key, Lee Co., collected by Clarence B. Moore.

Polygyra c. carpenteriana Bld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Guppya gundlachi Pfr.
Zonitoides singleyana Pils.

Explanation of Plate II.

Bifidaria pellucida hordeacella (Pils).

Fig. 1, 3, 5. Form *a*. Key West Fla. A. N. S. 104029.
Fig. 2. Form *a*. New Braunfels, Texas. A. S. N. 68888.
Fig. 4. Form *a*. Summerland Key, Fla. A. N. S. 104021.
Fig. 6, 7, 8. Form *b*. Key West. A. N. S. 104029.
Fig. 9, 10. Form *a*. Bahia Honda Key, Fla. A. N. S. 105521.
Fig. 11. Form *d*. New Braunfels, Texas. A. N. S. 68888.
Fig. 12. Form *d*. Key West. A. N. S. 104029.
Fig. 13. Form *b*. Key West. A. N. S. 104029.
Fig. 14. Form *c*. Bahia Honda Key. A. N. S. 105521.
Fig. 15. Form *a*. Key West. A. N. S. 104029.

Fig. 16. Form *b*. Key West. A. N. S. 104029.
Fig. 17. Form *b*. Bahia Honda Key. A. N. S. 105521.
Fig. 18. Form *d*. Bahia Honda Key. A. N. S. 105521.
Fig. 19. Form *b*. Bahia Honda Key. A. N. S. 105521.
Fig. 20, 21. Form *c*. Key West. A. N. S. 104029.
Fig. 22. Form *d*. Key West. A. N. S. 104029.
Fig. 23. Form *c*. New Braunfels Texas. A. N. S. 68888.
Fig. 24, 26, 27. Form *c*. Summerland Key. A. N. S. 102742.
Fig. 25. Form *c*. Bahia Honda Key. A. N. S. 105521.

(Key West, figs. 1, 3, 5, 6, 7, 8, 12, 13, 15, 16, 20, 21, 22. Bahia Honda Key, figs. 9, 10, 14, 17, 18, 19, 25. Summerland Key, figs. 4, 24, 26, 27. New Braunfels, Texas, figs. 2, 11, 23).

(*To be concluded*).

UNIO (LAMPSILIS?) PURPURIATUS SAY.

BY L. S. FRIERSON.

Though Mr. Say describes very well his *Unio purpuriatus*, its identity seems to have been nearly lost. That it may again be known to students, it is now figured, plate III, figs. 4, 5, and his description repeated. "Transversely oval, slightly oblong, in some specimens with a little tendency towards ovate; dirty yellowish or fuscous, obscurely radiate with blackish green; beaks behind [*before*] the middle, hardly raised; anterior [*posterior*] edge rounded, or rather composed of two nearly rectilinear lines; posterior [*anterior*] margin rounded; hinge margin regularly rounded; cavity of the hinge membranes (behind [*before*] the beaks) narrow but very obvious; basal margin arquated, a little compressed in the middle and sometimes almost contracted in that part; within purple, margin livid, anterior [*posterior*] submargin iridescent; primary teeth nearly direct, rather thick, striated; lateral teeth hardly extending beyond the sinus of the hinge margin. Length [*height*] one inch and three-fifths; breadth [*length*] three inches and one-tenth. Convexity over nine-tenths of an inch.

Remarks.—Conrad's identification of this species with *U. medellinus* Lea no doubt has confused the situation. Crosse and Fischer doubted this identification of Conrad's, but they erred in thinking that the name was badly spelled and *meant* to be *purpuratus*, preoc-

cupied by Lamark. Mr. Say intended this name to show that his shell was the Mexican analogue of *purpureus*, and hence his name *purpuriatus* is a valid name. Mr. C. T. Simpson's remark in his *Synopsis* that *U. strebeli* Lea was a *young medellinus* was an error, and still further confused the situation.[1] Examples of *U. purpuriatus* were collected by Mr. A. A. Hinkley and distributed as *U. strebeli*.

The species occurs in both white and purple nacre, and many are *entirely* rayless. The example figured is smaller than Say's, but some of Mr. Hinkley's specimens attained the dimensions given by Say.

UNIO (OBOVARIA) JACKSONIANUS, NEW SPECIES.

BY L. S. FRIERSON.

Shell ovate, smooth, rounded before and below, nearly straight from beak to post-point, which is about half way the height of the shell; umbonal ridge low, and the posterior area very narrow; beaks not high, sculpture not seen; nacre bluish white; iridescent behind; teeth double in left, single in right valve; cardinals stout, erect, laterals not very large; muscle scars confluent behind, separate before; pallial line obsolete behind. Length, 45 mm.; height, 33 mm.; thickness, 20 mm.

Habitat: Pearl River, Miss. (and also in the Yalabusha River, Miss.).

Numbers of this species have been in hand for several years and have been distributed largely under the name of "*U. castaneus* Lea, Variety." Collectors will rectify their names accordingly. The novelty of the present species was determined by gravid specimens collected by Mr. A. A. Hinkley, and by a comparison with *castaneus* of the Lea collection by Mr. Bryant Walker. This species has not the *female* form of *castaneus* and the dorsal scars are in the bottom of the beaks in place of being on the teeth.

In outline it is nearly exactly the same as *U. strodeanus* B. H. Wright (Proc. Acad. Nat. Sci. Phil., 1900, Plate 1, fig. 3), but dif-

[1] This error was caused by someone having marked a young *U. medellinus* "type" and misplacing it; and it finally got into the tray of *strebeli*. This explanation was given by Dr. Wm. H. Dall.

fers in being greenish, while *strodeanus* is dead black; its beak cavities are deeper, and its teeth are much longer, stouter and more erect.

From *U. curtus*, to which it is allied, it differs, lacking the pronounced swelling before.

Many of these shells show a constriction like the *U. constrictus* of Conrad, and it may be that this is a sexual mark.

Figs. 1 and 2 represent the normal shape, Fig. 3 the constricted form.

Types in the Academy of Natural Sciences, cotypes in my own collection, in the National Museum, and specimens of the same lot are in many other cabinets as "*castaneus*."

NOTES.

CARYCHIUM MINIMUM Mull.: It may interest students of geographical distribution, to learn that a thriving colony of *Carychium minimum* Mull., has been found in a greenhouse at Quincy, Mass. I have observed this species at intervals for nearly a year, and as it is becoming more plentiful, there seems to be a reasonable chance that it may escape to the surrounding country. Considering its natural habitat, there is a possibility of its becoming accustomed to our climate. W. F. CLAPP.

OPEAS CLAVULINUM KYOTOENSE Pils.: I have found a few specimens of *Opeas clavulinum kyotoense Pils.*, in a greenhouse at Cambridge, Mass., but only in the hottest house, although they are very hardy if kept in a warm vivarium. They will not survive a slight drop in temperature. Therefore there seems little likelihood of this species becoming a permanent addition to our northern fauna. Unlike the majority of our North American pulmonates this species does not appear to mind direct sunlight, but will leave the shade of a protecting leaf, to spend an hour or two in crawling on the glass, exposed to the rays of a bright midday sun.

I am indebted to Mr. George H. Clapp for the identification of this species. He states that specimens have also been found by him in Phipp's Conservatory, Pittsburgh, Pa., in 1901, and by Mr. Bryant Walker in a "Bigonia House" at Buffalo, N. Y.

W. F. CLAPP.

SMITH: MOLLUSCA OF THE SIERRA ELVIRA.
MOLLUSCA OF ADEN.

THE NAUTILUS.

VOL. XXVI. JULY, 1912. No. 3

NOTES ON THE MOLLUSCAN FAUNA OF THE SIERRA ELVIRA, SPAIN.

BY MAXWELL SMITH.[1]

While staying in Granada, Spain, during April 1910, the writer made several excursions for the day to the Sierra Elvira mountains. This striking range rises from the plain before Granada and may be distinctly seen from the battlements of the Alhambra.

The Sierra Elvira is a treeless Jurassic range named after the ancient town of Iliberris. It is covered with rocks so sharp in places that shoe leather offers little protection to the feet and climbing is necessarily a slow operation. On a clear day the sun reflected on the rocks makes the place not unlike a furnace. When the day is a cloudy one the biting cold wind from the snow-covered Sierra Nevada constantly keeps up. Nevertheless the splendid view amply repays the climber even if he is not in quest of snails. There are several small caves in a lofty valley several miles from the railway which skirts the base of the Sierra far below. Several species were found near the mouth of one of these caves. The more distant portions of the range no doubt contain other species not taken by the writer.

One day the ascent of the Sierra Elvira was made from Pinas Puente a quaint old town in an attractive situation on the Cubillas. In the brooks flowing into this stream a species of Melanopsis was noticed in abundance. It was at Pinas-Puente that Columbus was overtaken by the messenger of Queen Isabella in 1492, when in

[1] Read before the Brooklyn Conchological Club, January 29, 1912.

despair he had given up negotiations with the Spanish monarchs and was actually on his way to France.

I was accompanied on these trips by William M. Bunker, Honorary President of the San Francisco Chamber of Commerce. Mr. Bunker assisted in turning over many large stones, adhering to the under surface of which the majority of the specimens were found.

Leucochroa candidissima Drap. This species lives on the southern sides of the Sierra.

Helix sp. A small form of the *caperata* group.

Helix alonensis Fér. (pl. IV, fig. 5). One example obtained.

Helix (*Iberus*) *gualtierana* Linn. Plate IV, fig. 1 (typical), 2, 3, (convex form).

Eighteen specimens are before me: a selection made with a view to proportion, arranging these in lots according to the height of the spire, there are :

10 shells with a flattened spire (a few are sunken above) (fig. 1).

4 shells in which the spire is more produced (fig. 2).

4 shells with the highest spire (fig. 3).

In the first lot the examples appear to approach closely the typical form of *gualtierana*, which was described by Linn. The typical form may easily be distinguished by the flattened or sunken spire, the half or nearly covered umbilicus, the strongly carinated periphery and the aperture which is decidedly broader than high. Pilsbry's figure (Manual, Vol. IV, plate 53 fig. 6) agrees perfectly.

A variety (plate 4 fig. 2) has the aperture of the type but with a more developed spire. In the third lot (fig. 3) the shells run about the same size as the type. The peripheral keel is similar. On the other hand the aperture is of a distinctly different shape. In the majority of the examples examined *it is nearly as high as wide*, less extended laterally than in the typical form.

Helix gualtierana var. *laurenti* Bourguignat (Revue et mag. de zoologie, 1870, p. 95, pl. 14, figs. 5–7) was based on a shell from Mt. Gador, near Almeria. It is decidedly *conic* above, the apical portion is not depressed as in convex forms of *gualtierana* though a little flattened at the tip ; the base is figured as rather strongly convex. Figs. 11–13 of pl. 53, Man. Conch. IV, are similar though larger, but figs. 9, 10, copied from Kobelt, cannot be this race.

I took a solitary example, dead and bleached, which agrees with the original account of *laurenti* in the conic top. It is solid, much

more finely sculptured than *gualtierana*, umbilicus wholly closed. It differs from *laurenti* by the more deeply descending last whorl and the much less convex base. Alt. 20, diam. 31 mm. If found to be a different race, it may be called ver. *granadæ* (pl. IV, fig. 4).

Helicodonta (*Caracolina*) *lenticula* Fér. The examples before me are smaller than the Sicilian specimens.

Buliminus quadridens Müll. Several dozen specimens were taken. Dr. Pilsbry, to whom I submitted the form, writes, "The *Buliminus* is *B. quadridens* Müll., rather a long form of the species, but certainly that."

LYMNAEA AURICULARIA NEAR PHILADELPHIA.

BY BAYARD LONG.

The writer's proper field of activity belongs in the realm of botany; but like many another, he sometimes wanders from the beaten path of his own special science. A note, however, upon the occurrence of a foreign species markedly thriving in our own natural habitats, and there associating with indigenous forms in so perfectly a naturalized state that only a knowledge of the normal distribution of the species makes it possible to detect the status of its occurrence: such a note seems rather familiar ground, since there is such a host of introduced plants whose migrations must be kept under observation. So the writer may, in a measure, be justified in breaking into Conchology. Botanists make rather a point of putting upon record the early occurrences of foreign elements entering into our flora, because, besides being of an historical interest, a lack of such data, among plants at least, has often led to considerable confusion and error as to what are actually indigenous plants of any given area. Such a condition is probably not so likely to occur among shells, but still it may be of no less importance to have definite record of observations of species becoming naturalized, in case the forms should possibly become widespread and a knowledge of their original centres of dissemination lost.

In 1910 there was brought to the Philadelphia Academy by Samuel R. Jacob some shells which he had casually collected in Europe, and also some specimens of *Lymnæa auricularia* (Linn.) which, however, were said to have been collected from near

Philadelphia in a pond about one mile south of Ogontz, Montgomery County, Penna., along Old York Road. A possibility of accidental mixture of specimens was thought to exist, and no published record made of it.

Upon Mr. E. G. Vanatta's learning that I lived near the *auricularia* locality, he mentioned the case to me and I felt confident that the station referred to must be that known as Dobbin's pond at Old York Road and Ashbourne Road. He asked me if I would not sometime examine the pond with the hope of verifying the Jacob record. I accordingly did so on May 22nd of this year and found, associated with *Planorbis antrosus* Conrad, an abundance of a large *Lymnæa* which proved to be the desired *L. auricularia*, as was verified the following morning by Dr. Pilsbry and Mr. Vanatta when I brought in living material.

Dobbin's Pond was doubtless at one time well kept, since it is situated on private property, but for many years the estate has been largely left to take care of itself, and consequently much debris of refuse, dead leaves and sticks has collected in it. A delta formation of considerable extent occurs at the inlet stream. Few, if any, large water-plants, like pond-lilies, occur, but there is an abundance of algal growth, and pond-scums cover much of the surface.

The *Lymnæa* is a very striking species, both because of the large size of full-grown individuals, and, of the conspicuous dark mottling of the mantle on a light yellow ground as seen through the shell on the younger individuals. The mottling was commonly obscured in the large specimens because of algal growth and dirt. Most of the animals, especially the half-grown ones, were found crawling around in shallow, quiet water on the muddy bottom, along the sides of the delta. The large individuals were generally found attached to floating logs or sticks, and one was seen sticking to grass stems hanging into the water. The majority of the specimens seen were doubtless half-grown individuals from the past season. The shells were found to measure on the average about 17 mm. × 12 mm. The largest shells measured about 28 mm. × 21 mm., but some of Jacob's collection are as large as 30 mm. × 24 mm. One specimen, found dead, has the aperture very beautifully and widely flaring but in most of the material this is not well-developed, or else has been broken away.

Except for a very possible solution, suggested by Mr. Vanatta,

I am rather at a loss to account for the occurrence of this European species at this station. In both the localities previously reported, that of Mr. H. E. Walter at Lincoln Park, Chicago, reported by Mr. F. C. Baker,[1] and that of Mr. R. E. Call, at Flatbush, Brooklyn, N. Y.,[2] the introduction of the species seems to be satisfactorily traced to European plants cultivated in either green-houses or ponds. But neither of these conditions certainly prevail at the present time at the new locality, or to furnish a particularly satisfactory solution. Mr. Vanatta suggests that, from the common use of these snails in aquariums, and the pond being on private property once doubtless well taken care of, it is very possible that the contents of an aquarium may have been transferred to the pond at some time or other. I have since made inquiries and am told that the pond has contained gold fish for many years and that they are at present still frequent there. So the evidence seems rather suggestive that this solution may be correct.

Suffice it, however, that the species has certainly become extensively naturalized in this pond and is actually one of its most prominent molluscan elements.

A NEW OREOHELIX FROM COLORADO.

BY H. A. PILSBRY.

We have recently received from the Hon. Junius Henderson a series of shells collected by Mr. Albert Dakan, which seem to represent a new specific form, which may appropriately be named for Mr. Henderson, whose scientific works include an excellent account of the mollusks of Colorado.

OREOHELIX HENDERSONI, n. sp.

The shell is solid, in shape much like *O. strigosa depressa* (Ckll.), the last whorl angular in front of the aperture, becoming rounded in the last half, shortly descending in front. First 2½ whorls rusty brown; the ground color then becomes very pale brown, and a narrow darker band midway between sutures appears, usually not continuing upon the last whorl, which is lighter, more cream-colored,

[1] Nautilus xv, p. 59, 1901.

[2] Science, New Series, xvi, p. 65, 1902.

beneath. Old shells, by loss of the cuticle, have the last $1\frac{1}{2}$ whorls opaque white with some faint corneous or ruddy stains. Embryonic shell of $2\frac{1}{3}$ whorls, the first somewhat convex, first half whorl smooth, next whorl having fine, close, radial thread-like striæ, last $1\frac{1}{3}$ whorls, having similar striæ and spiral cords, becoming coarse on the last half whorl. This sculpture stops abruptly at the end of the embryonic stage. Neanic and adult stages have rather fine, irregular wrinkles of growth, indistinctly cut by very weak lightly impressed spiral lines which are often almost obsolete. Aperture quite oblique, nearly round.

Alt. 8.6, diam. 16.3 mm.; whorls $4\frac{3}{4}$.

Genitalia as figured for *O. s. depressa* and *O. elrodi*, the end of the penis closely resembling the latter species. Epiphallus tapers at the end. Length of penis 13.6, of epiphallus $5\frac{1}{2}$, of spermatheca and duct $14\frac{1}{2}$ mm.

North bank of Little Thompson Creek, about 10 miles N.-W. of Longmont, Colorado. About 160 living and over 100 dead shells found among roots of "woodbine" in loose limestone talus, at southern point of ridge of Niobrara Limestone, July 26, 1911, by Mr. Albert Dakan.

The strong spiral sculpture of the embryonic shell, abruptly giving place to oblique wrinkle-striæ at the inception of the neanic stage, distinguishes this species from *O. strigosa depressa* (the common Colorado form of *strigosa*), to which it is related by the soft anatomy. The early stages are much as in *O. yavapai*, but that species and its varieties differ strongly by the very short penis.

O. gabbiana (Hemph.), from the Oquirrh Mts., differs from *hendersoni* by the less strong embryonic spiral and more strongly developed, widely spaced spirals of the last whorl, which is carinate or angular. An *Oreohelix* from Glenwood Springs, Colo., which has been provisionally referred to *gabbiana* is probably a form of *hendersoni*. Another form which seems referable here is from Newcastle, Colorado, also collected by Mr. Albert Dakan. The shells are very large, alt. 14.5, diam. 24 mm., with $5\frac{1}{3}$ whorls. It was found on a hillside, out by thousands on a moist day.

I should not complete this account without offering an apology to Mr. Henderson for allowing the name of this species to appear in his article on Oreohelix Colonies (p. 10 of the May number), in advance of any published description. I had written the above account some

months before, when the shells were received. The press of other matter and the habit of giving other contributors precedence over the Editors in our limited space, explain the appearance of the MS. name. To tell the honest truth, I had forgotten that it was not published!

LAND SHELLS OF SOUTHERN FLORIDA.

BY E. G. VANATTA.

[Concluded for p. 22.]

Pavilion Key, Monroe Co., collected by Clarence B. Moore.

Truncatella caribæensis 'Sby.' Rve.

Truncatella c. succinea Ad.

Bifidaria p. hordeacella Pils.

Pelican Key, Lee Co., (A small key near the entrance to Chokoloskee Key), collected by Clarence B. Moore.

Polygyra c. carpenteriana Bld. Some of the specimens lack the internal lamella.

Pine Island, Lee Co., collected by Clarence B. Moore.

Truncatella caribæensis 'Sby.' Rve.

Truncatella c. succinea Ad.

Truncatella bilabiata Pfr.

Truncatella clathrus Lowe.

Practicolella jejuna Say.

Polygyra septemvolva volvoxis Pfr.

Bifidaria p. hordeacella Pls.

Euglandina rosea Fer.

Euglandina rosea parallela Binn.

Zonitoides singleyanus Pils.

Little Pine Key, Monroe Co., collected by Dr. H. A. Pilsbry and C. T. Simpson.

Truncatella caribæensis 'Sby.' Rve.

Thysanophora selenina Gld.

Thysanophora incrustata Pocy.

Thysanophora plagioptycha Shutt.

Praticolella jejuna Say.

Polygyra c. carpenteriana Bld.

Microceramus pontificus Gld.

Pupoides modicus Gld.

Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Varicella g. floridana Pils.
Vitrea dalliana ' Simp.' Pils.
Guppya gundlachi Pfr.
Succinea floridana Pils.

Big Pine Key, Monroe Co. Collected by H. A. Pilsbry, C. T. Simpson, S. Brown and H. W. Fowler.

Truncatella caribæensis succinea Ad.
Helicina o. clappi Pils.
Helicina tantilla Pils.
Thysanophora incrustata Poey.
Polygyra c. carpenteriana Bld.
Urocoptis poeyana variegata Pfr.
Microceramus pontificus Gld.
Strobilops hubbardi Br.
Pupoides modicus Gld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Vertigo variolosa Gld.
Euglandina r. parallela Binn.
Vitrea dalliana ' Simps.' Pils.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Succinea floridana Pils.

Porpoise Point, Monroe Co. Part of a key. Collected by Clarence B. Moore.

Polygyra c. carpenteriana Bld.
Bifidaria p. hordeacella Pils.

Rabbit Key, Monroe Co. Collected by Clarence B. Moore.

Truncatella bilabiata Pfr.

Polygyra cereolus carpenteriana Bld. Many of the specimens from this place lack the internal lamina.

Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.

East Cape, Cape Sable, Monroe Co. Collected by Clarence B. Moore.

Helicina o. clappi Pils.

Seminole Point, Monroe Co. Part of a key. Collected by Clarence B. Moore.

Truncatella caribæensis 'Sby.' Rve.

Truncatella bilabiata Pfr.

Polygyra c. carpenteriana Bld. Many of the specimens in this lot have the internal lamina reduced to a few indistinct nodules.

Bifidaria p. hordeacella Pils.

Bifidaria rupicola Say.

Vertigo rugosula oralis St.

Snake Key, Monroe Co. Collected by Clarence B. Moore.

Truncatella bilabiata Pfr.

Polygyra c. carpenteriana Bld. The specimens from this place are very small and many have a very high spire; they also almost lack the internal lamella.

Bifidaria p. hordeacella Pils.

Snipe Key, Monroe Co. Collected by S. Brown and H. W. Fowler.

Helicina o. clappi Pils.

Sugar-loaf Key, Monroe Co. Collected by H. A. Pilsbry and C. T. Simpson.

Truncatella bilabiata Pfr.

Truncatella clathrus Lowe.

Helicina orbiculata Say.

Helicina o. clappi Pils.

Thysanophora selenina Gld.

Thysanophora incrustata Pocy.

Thysanophora plagioptycha Shutt.

Polygyra cereolus Mühlf.

Polygyra c. carpenteriana Bld.

Microceramus pontificus Gld.

Strobilops floridanus Pils.

Strobilops hubbardi Br.

Varicella g. floridana Pils.

Pupoides modicus Gld.

Bifidaria p. hordeacella Pils.

Vitrea dalliana 'Simps.' Pils.

Summerland Key, Monroe Co., collected by Dr. Pilsbry.

Truncatella bilabiata Pfr.

Helicina o. clappi Pils.
Helicina tantilla Pils.
Thysanophora selenina Gld.
Thysanophora incrustata Poey.
Thysanophora plagioptycha Shutt.
Polygyra cereolus Mühl.
Pupoides modicus Gld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Varicella g. floridana Pils.
Vitrea dalliana 'Simps.' Pils.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.

Torch Key, Monroe Co., collected by H. A. Pilsbry.
Chondropoma dentatum Say.
Truncatella caribæensis succinea Ad.
Truncatella bilabiata Pfr.
Truncatella clathrus Lwe.
Polygyra cereolus Mühlf.
Polygyra c. carpenteriana Bld.
Cerion incanum Binn.
Bifidaria p. hordeacella Pils.

A CONCHOLOGICAL MUSEUM.

Conchologists the world over are interested in the work of Mr. Y. Hirase, of Kyoto, Japan. I doubt if many of them are aware how deeply they are indebted to him. His quarter century of exploration of Japan, by land and by sea, of Corea, and of China, at great personal sacrifice of money and time, has given to science many new species, enriching cabinets all the world round with choice specimens most delicately handled.

He has an extensive and valuable collection of material, containing co-types of the numerous new species brought to light by his efforts. He has plans for the establishment of a Conchological Museum for the preservation and exhibition of this collection. He has in hand cash for about three-fourths of the cost of this undertaking. He still needs $5,000 to finish the work as planned.

Mr. Hirase has expressed to me, in writing, his willingness, in case he is aided by friends in America to the extent of $5,000, to have that sum expended under the supervision of the Trustees of the Doshisha University, in paying the last bills on the plant; to guarantee perpetually the free use of the Museum to students of the Doshisha University; and, in case of the discontinuance of the Museum, to cover into the treasury of the Doshisha for the use of that institution, the $5,000 advanced in aid of his undertaking.

A number of gentlemen have already by word of mouth or in writing indicated a desire to aid Mr. Hirase. Is not the present the best time to carry out this purpose?

Please send your checks—large or small—to Mr. C. W. Johnson, Boston Society of Natural History, Boston, Mass., and thus discharge, in part, the debt due Mr. Hirase. He does not seek pay. He is worthy of our best sympathy and encouragement.

A good museum of the kind he plans will be of immense value to Japan and the world of science, will be a generous crown to his life of hard work, and an encouragement to other lovers of science to emulate his example. MARSHALL R. GAINES.

NOTES.

JAMES JOHNSON WHITE.—We regret to announce the death of our friend Mr. J. J. White, which occurred at Rockledge, Florida, April 26, 1912. He was born in Kittanning, Pa., Feb. 13, 1846. Moved with his parents to Illinois, and later lived in Iowa. In 1885 he removed to Florida, living at Palm Beach, and since 1892 at Rockledge. Mr. White was deeply interested in the study of mollusca, and by correspondence and exchange was known to many of the readers of THE NAUTILUS.

UNIO SILONGWEENSIS, a new name for *Unio vicinus* Preston not Lea. Mr. Bryant Walker has called my attention to the fact that the name *Unio vicinus*, used by me in the Annals & Magazine of Natural History, Ser. 8, Vol. VI, 1910, p. 60, Pl. IV, fig. 7 for a Central African species, was preoccupied by Lea in 1856 (Jl. Acad. Nat. Sci., Philadelphia, Vol. 4, p. 61 and Lea, Obs. on genus Unio, Vol. 6, p. 61). I now propose the new name *Unio silongweensis* for the African form.—H. B. PRESTON.

Mr. C. T. Simpson, the well-known author of the "Synopsis of the Naiades," has arranged for the publication of his "Descriptive Catalogue of the Naiades." This is the companion volume to the Synopsis and was prepared immediately after that work appeared, but for various reasons its publication has been delayed until now. It will contain full descriptions of all the species recognized in the "Synopsis" with comparative notes, keys, etc. Descriptions and references to all the species described since the publication of the "Synopsis" have been added, bringing the subject down to date. Unfortunately it is not to be illustrated, but its publication will for the first time place in the hands of the students of the *Unionidæ* adequate descriptions of all the species in one volume. The cost and in many cases the practical impossibility of obtaining the literature necessary for any accurate work in studying this family has been a great drawback to interesting our American collectors in this group, and, in the absence of a fully illustrated manual, this work of Mr. Simpson's will go far towards supplying the long-felt want of such a publication.

It is expected that the Catalogue will be published early in the fall and will be a volume of from 800 to 1000 pages. It is to be published by Bryant Walker of Detroit, Mich.

New Orleans Mollusca.—The writer with Mr. J. B. Upson, spent the best part of one day the last week of December, 1880, on the shore of Lake Pontchartrain, to the east of Spanish Fort and collected the following species:

Polygyra espiloca Ravenel, common.

Polygyra febigeri Fér., abundant. These two species of Polygyra were determined for the writer by Thomas Bland, in a letter dated May 20, 1881.

Zonitoides arborea Say.

Zonitoides minuscula Binney.

Glandina bullata Gould. Mr. Bland said of this form "*Glandina truncata*, var. (scarcely *bullata*)" several fine specimens were found and some quite young.

Rumina decollata L. One dead example.

Succinea campestris Say, common.

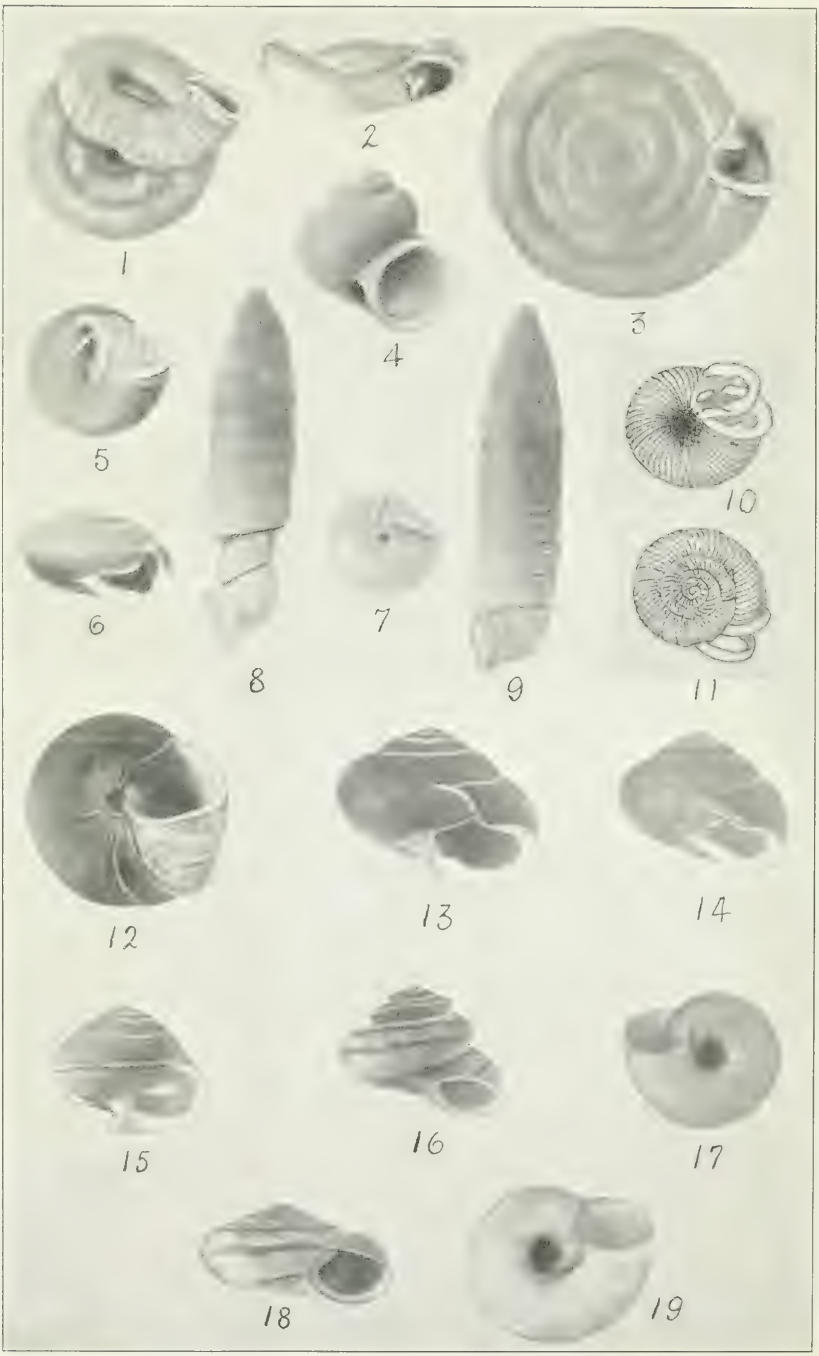
Planorbis lentus Say, scarce.

Segmentina havanensis Pfr., common.

Lymnæa techella Hald., few.

Gnathodon cuneatus Gray, great quantities of dead shells.

Also young specimens of *Viviparus*, *Campeloma* and *Sphærium*.—A. A. Hinkley.



DANIELS: ABNORMAL SHELLS.

THE NAUTILUS.

VOL. XXVI. AUGUST, 1912. NO. 4

TWO NEW LAND SHELLS FROM CALIFORNIA.

BY HARRY EDSON

SONORELLA ARGUS, n. sp.

Shell small, depressed, flesh-colored, with a narrow brown band encircling the whorls a little above the periphery. This shell approaches very nearly *S. fisheri*, Bartsch but differs in color, size, and in having a wider umbilicus.

Collected by Mr. A. M. Strong at the Iron Cap copper mine, Argus range, Inyo Co., California. Cotypes in the geological museum of Stanford University, and A. N. S. Phila.

The type measures: maj. lat. 11.3 mm., min. lat. 9.5 mm., alt. 5.7 mm., aperture: maj. lat. 6 mm., alt. 5.3 mm., umbilicus, 2 mm.

EPIPHRAGMOPHORA DUPETITHOUARSI CUESTANA, n. subsp.

Shell large, depressed, polished, obliquely striated, with seven whorls, the last whorl descending slightly near the aperture; deeply and widely umbilicated, showing three volutions; lip slightly reflexed, the ends approaching; color translucent brown, circled near the top of the whorls by a dark brown band edged with yellow. The type measures; greater diam. 26½ mm., lesser diam. 22½ mm., alt. 15½ mm.; aperture, width 16 mm., alt. 13½ mm., including peristome.

This shell is quite similar to *sequoicola* Cooper, but shows no signs of being hirsute and has much coarser striations.

Habitat Cuesta Pass, Santa Lucia Mts., California, collected by Mr. Harold Hannibal. Cotype in coll. A. N. S. P.

Both species will be figured on a future plate.

ABNORMAL SHELLS

BY L. E. DANIELS

In the United States as elsewhere shells are frequently met with that are abnormal to a greater or less degree due to the shell having met with an injury during its growth.

Tryon, in the American Journal of Conchology, Vol. 2, plate 1, fig. 4, figures an abnormal specimen of *Planorbis bicarinatus* Say, from the collection of Charles M. Wheatley Esq., of Phoenixville, Pa., collected by him at Mexico, Oswego Co., N. Y. He says "this is the first American specimen which we have observed to deviate much from the normal form; reversed or scalariform shells being very much rarer in America than in Europe. Some of our species of *Lymnæa* are sometimes slightly scalariform, and in the *Viviparidæ* this is more frequent, but the deviation has never been observed to be very great. *Melantho integra* and *decisa* are both occasionally met with, reversed. I believe that no scalariform *Helix* has been observed in the United States, and the reversed specimens known do not exceed ten or twelve."

Thomas Bland in "Remarks on Certain Species of North American Helicidæ Part 3," 1862, says. "In one of my specimens of *H. tridentata*, after completion of the shell, the animal continued the last whorl about 2 mill beyond the lip, partially reflected the new lip, and added two incipient teeth in advance of the old ones. On plate 4, fig. 20 a sketch is given of the very singular reparation of one of my specimens of *H. septemvolva*. The fracture was behind the aperture, which the animal in consequence abandoned, but it formed a new one by reflecting the outer lip, on the lower part of which it added a small tooth,—it found insufficient space for another partial tooth behind the old aperture."

Binney in the Manual of American Land Shells, page 282, fig. 300, figures an abnormal specimen of *Stenotrema monodon*. The peristome having been broken after the animal's arrival at maturity, a new peristome has been formed somewhat in the rear of the first, and a new parietal tooth added. On page 291 he figures *P. tridentata* with a double peristome.

S. C. Wheat in Bulletin of the Brooklyn Conchological Club figures a specimen of *Pyramidula alternata* Say (fig. 5) found near

Ithaca, N. Y. It is terraced, the suture being placed far below the carina of the preceding whorl. The carina is unusually sharp. Another specimen (fig. 4) was flat, the suture being above the carina and deeply impressed. He also figures an abnormal *P. thyroides* and *P. tridentata.*

H. A. Pilsbry in Mollusca of the Southwestern States I, page 274, say: "Scalariform monsters are not rare, but the inception of that abnormal condition seems to be invariably traceable to an injury of the shells." He figures on plate XXIV fig. 32 a scalariform specimen of *Oreohelix strigosa concentrata* (Dall).

Through the kindness of the Editors of "The Nautilus" I am enabled to present to its readers the following descriptions and figures of abnormal specimens in my cabinet.

Sonorella coloradoensis (Stearns).

East side of Powell's Plateau near Mojave Creek, Grand Canyon, Arizona, 1909.

The shell is scalariform, due no doubt to an injury when young.

Polygyra cereolus (Mühlf). Pl. V, figs. 1, 2, 3.

Long Boat Key. Tampa Bay, Fla., 1900.

One specimen (fig. 1) is normal up to the end of the eighth whorl. A break then occurred, after which the whorl deviates downward, is abruptly recurved, traversing the base across the umbilical region. A nearly normal aperture is formed. In another shell, fig. 2, the whorl adjacent to the aperture dips down for a short distance, subsequently rising above the level of the spire. A well-formed normal example is shown in fig. 3.

Polygyra tridentata (Say.) Pl. V, figs. 10, 11.

Wyandotte, Crawford Co., Ind., 1903.

This shell had been broken back of the peristome, the animal instead of repairing the break retreated eight mm., and formed a new peristome and parietal tooth.

I succeeded in extracting the animal without breaking the outer peristome although the attachment to the shell was very slight, this (the outer) peristome being dead.

Polygyra inflecta (Say). Pl. V, fig. 6.

Jeffersonville, Clark Co., Ind., 1903.

Peristome malformed, the callus wanting above, teeth rudimentary.

Polygyra profunda (Say). Pl. V, fig. 12.

Near Hoge's Bridge, Morris, Ills., 1910. This shell had formed a peristome, then carried the shell forward twelve mm. and formed a second peristome. The shell between the two peristomes is white, has no epidermis, and has a rough appearance.

Polygyra albolabris (Say). Pl. V, fig. 13.

North Vernon, Jennings Co. Ind., 1903. In one specimen the last two-thirds of the body-whorl has been injured, resulting in a linear furrow running parallel with the suture. Another shell (fig. 13) was injured before forming the peristome which has two projecting points. The umbilicus is partly open.

Polygyra exoleta (Binn). Pl. V, fig. 14.

Mitchell, Ind., 1901. Peristome malformed, bisinuate.

Polygyra elevata (Say). Pl. V, fig. 15.

Mitchell, Ind., 1901. This specimen appears to have attained its growth, and apparently had partially formed the peristome, for at the proper place a parietal tooth was formed which is about one-half grown. The last half of the body-whorl was then broken off and a new peristome and parietal tooth were formed.

Polygyra hirsuta (Say). Pl. V, fig. 7.

Bass Lake, Starke Co., Ind., 1902.

Aperture malformed exactly as in the specimen of *elevata* described above, the last part of the whorl having been broken off after the parietal tooth was half formed, and a new peristome and tooth were developed a fourth of a whorl behind the original aperture.

Polygyra fraterna (Say). Pl. V, fig. 5.

Brookville, Ind., 1903.

This shell had formed a peristome and parietal tooth, then carried the shell forward five mm. and formed another peristome and parietal tooth, the last aperture being small. The original parietal tooth remains standing deep within. This shell belongs to the same class of monster described above for *P. profunda*. It is unlike most abnormal shells which are due to breakages, for here a second period of growth is superposed upon a normally formed and completed shell.

Holospira bilamellata Dall. Pl. V, figs. 8, 9.

Hacheta Grande Mts., New Mex., 1910.

This shell was normal up to the penultimate whorl, when without any apparent injury it contracts suddenly to three-fifths the former diameter. The last whorl enlarges again somewhat, and is nearly normal. A normal example is figured for comparison, fig. 9.

Holospira n. sp.

Dragoon Mts., Arizona, 1910.

A strongly ribbed new species which will shortly be described by Messrs. Pilsbry and Ferriss. The shell was broken at the end of the eighth whorl. The next $2\frac{1}{2}$ whorls are ribless; ribs then begin again irregularly, finally becoming normal on the last whorl.

Oreohelix strigosa depressa (Ckll) Pl. V, fig. 16.

Jacob's Canyon, Kaibab Mts., Ariz., 1910.

A scalariform specimen, the last whorl free in front. There are no signs of this shell ever having been injured in the least. Normal shells are shown in figs. 18, 19.

A reversed specimen from Powell Plateau, Grand Canyon, Ariz., 1909 is shown in fig. 17. J. H. Ferriss of Joliet, Ills., has a similar one.

Planorbis bicarinatus Say. Pl. V, fig. 4.

Lily Lake, La Porte, Ind., 1909.

This extraordinary specimen has the general shape of *Viviparus intertextus* with a small umbilicus and a deeply channeled suture. The aperture is oval with expanded peristome. So abnormal in shape is this specimen that it takes some study to see the common *Planorbis bicarinatus* in it.

Campeloma decisum (Say).

Pine Lake, La Porte, Ind., 1906.

While reversed specimens of *Campeloma* are not rare the novelty of this one is that it contained three young, all of which are reversed.

Note by the Editor.—Little has been published upon abnormal shells in this country, though there must be abundant material scattered among collections. The notes given above afford suggestions for a classification of teratologic shells into several classes as follows:

1. Shells in which growth has been resumed after the completion of a normal peristome, figures 5 and 12.

2. Shells in which broken parts have been repaired or restored.
   2*a*. Broken peristome repaired, figs. 13, 14.
   2*b*. A new peristome developed behind the original one after breakage, figs. 7, 10, 15.
3. Shells coiling abnormally.
   3*a*. Shell sinistral, fig. 17.
   3*b*. Shell scalariform, figs. 4, 16.
   3*c*. Shell irregularly coiled, figs. 1, 2, 8.

Part of these cases are always due to breakage; others, such as no. 1 and 3*a* to more obscure constitutional conditions. Scalariform shells may be due to several causes. The subject is of some importance from an evolutionary standpoint because the modifications denoted by classes 1, 3*a*, 3*b* and 4*c* have in some cases become actually characteristic of species or genera.

Collectors having material enlarging our knowledge of the subject as illustrated by Mr. Daniels are invited to make it known.

Figures 1 to 9 of plate V are about double the natural size.

NEW CUBAN LAND SHELLS: I. ANNULARIA AND CHONDROPOMA.

BY H. A. PILSBRY AND JOHN B. HENDERSON, JR.

The following species will be illustrated in connection with the second paper of this series.

Annularia ramsdeni n. sp.

The shell is openly umbilicate, wider than high with conic spire. Last whorl brownish-corneous or whitish, the spire light red, whorls 4½, strongly convex, the last tubular. Suture narrowly channeled, the axial threads forming little points where they pass over the raised edge of the channel. Sculpture of closely crowded lamina-like axial threads, their intervals having one or two smaller threads. There are a few low spiral cords within the umbilicus and a stronger one near its opening. The first 1¾ whorls are smooth and well raised. Aperture oblique, circular, pale red within the lip. Peristome expanded, duplicated by a thin outer lamina on the columellar and upper sides, dilated in a forwardly concave lobe above, which is appressed to the preceding whorl.

Operculum of three whorls, each nearly covered by a white, level lamella arising from the inner margin, spreading nearly to the outer.

Male: alt. 11.8, diam. 13 mm.

Female: alt. 12.5 diam. 15 mm.

El Jique de la Argolla, Barrio de Rio Seco de San Antonio, 15 miles northeast of Guantánamo, under stones, Charles T. Ramsden 12–24-'11.

The cotypes figured were observed coupling Mar. 19, 1912.

This species is closely related to *A. pseudalatum*. It is larger, with more rapidly enlarging whorls, the aperture relatively larger, its diameter more than half that of the shell, while in *A. pseudalatum* it is less than half; and it differs especially in sculpture, the major axial threads being much more numerous and closer together. *Annularia* (or *Choanopoma*) *alatum* Pfr. is a more opague, solid shell with no sutural channel, coarser, unequal striæ, and a differently formed lip.

In both *A. ramsdeni* and *A. pseudalatum* the last whorl is free in front just before finishing the lip, but the additional thin lamina and superior appendage of the lip connect with the preceding whorl in the fully adult stage. This species is named for the discoverer, Mr. Charles T. Ramsden.

Dr. W. H. Dall has called attention to the fact that the generic name *Annularia* has precedence over *Choanopoma* for species of this type.

ANNULARIA PSEUDALATUM Torre, n. sp.

The shell is openly umbilicate, wider than high, with a low conic spire; corneous; whorls $3\frac{3}{4}$ to $4\frac{1}{3}$, very convex, the last tubular, barely in contact with the preceding at the aperture. Sculpture of straight, slightly retractive and very thin axial threads, separated by intervals in which there are several (three to five) delicate axial striæ. There are several weak spiral cords within the umbilicus, the lowest one stronger than the others. The first $1\frac{3}{4}$ whorls are smooth. Aperture oblique, circular, the peristome thin, narrowly expanded, duplicated by a thin outer lamina along the columellar, parietal and upper margins, this lamina expanding in a forwardly concave lobe above. Operculum of about 3 whorls, similar to the preceding species.

Alt. 7.2, diam. 10.2 mm.

Alt. 8, diam. 10 mm.; diam. of aperture, with peristome 4.5 mm.
Alt. 7, diam. 9 mm.

Farallones east of Hermitage, Charles Wright.

This form is described and figured from specimens determined by Professor de la Torre, for comparison with the preceding. It is not uncommon in the older collections, under the name "*Choanopoma alatum Pfr.*" Pfeiffer's species is larger, more solid, opaque fleshy-white, with the interior orange; the aperture is much more oblique and the sculpture entirely different.

CHONDROPOMA CARENASENSE n. sp.

The shell is perforate, tapering-cylindric, truncate, about $3\frac{1}{2}$ whorls remaining; very pale brown, with small often indistinct dark spots arranged in vertical series at irregular intervals, sometimes having 5 or 6 narrow, faint, spiral bands, with spots as above. Sculpture of many fine spiral cords, 10 to 14 on the penult whorl, crossed by more closely set vertical lamina-like threads which have small nodes where they cross the spirals, and finely crenulate the suture, where each stands separate. Whorls convex, the last ascending a little in front. Aperture ovate; peristome expanded, built out in a narrow flat margin, widest as the columeller margin and at the posterior angle, where it ascends in a very short lobe or obtuse point; parietal margin appressed to the preceding whorl. The operculum retracts about one-fourth of a whorl within, is light brown, with a spiral convexity just outside the suture.

Length 12.5, diam. 7.5 mm.; length of aperture with peristome 6 mm.

Length 12, diam. 7 mm.; length of aperture with peristome 5.7 mm.

Length 10.3, diam. 6 mm.; length of aperture with peristome 5 mm.

Cayo Carenas, in Cienfuegos Bay, Pilsbry, 1903, and Henderson 1910.

C. candeanum (Orbigny) tapers more, to a narrower truncation, and the sutural denticulation is more widely spaced. In *C. carenasense* every vertical thread denticulates the suture, none being united or dropped out there. It is an abundant snail on Cayo Carenas, a tiny islet now nearly covered with residences.

CHONDROPOMA WILCOXI n. sp.

The shell is perforate, ovate-twisted, truncate, 3 to $3\frac{1}{2}$ whorls remaining. Pale fleshy buff, indistinctly marked with spiral series of small brown dots. On the last whorl there are 6 such rows, three more distinct; on preceding whorls there are four rows of dots; the suture has a narrow whitish margin below. Sculpture of many subequal spiral threads intersected at right angles with narrower, slightly weaker, axial laminæ, producing an evenly latticed surface; on the last whorl there are about 40 spirals. The whorls are rather strongly convex; last whorl ascending slightly to the aperture. The aperture is vertical, ovate, somewhat acuminate above, brown inside. The peristome is white; it expands a trifle, and is somewhat thickened on the face, which is narrow and convex. At the upper angle it is a very little dilated.

Length 19, diam. 11, length of aperture $8\frac{1}{4}$ mm.

Rosario, east shore of Ensenado Cochinas, in forest. Henderson and Simpson.

STRANGE NAMES FOR OLD ACQUAINTANCES

BY C. HEDLEY AND H. A. PILSBRY.

It is pleasant to find that there was a time when the editor was not regarded as the natural enemy of his contributor. Thus when Dr. Johann Hermann, aforetime Professor at Strassburg, presents an essay on conchology to his friend the editor of "Der Naturforscher" he greets him cordially and at the conclusion takes affectionate leave.

Did this quaint old essay not disturb our nomenclature, we should not need to disturb the dust which for nearly a century and a half has gathered on this venerable periodical. But the names which Hermann gave have escaped the attention of most modern writers, yet they are presented regularly and precede several now in use. Like Marryat, the novelist, our author made but a single contribution to molluscan literature. In the professor we find a careful worker: not only did he fulfill the modern requirements of nomenclature, but he embellished his paper by a colored engraving illustrating five species.

Two species of Spondylus are contrasted and are named respectively *S. mediterraneus* and *S. americanus* (Der Naturforscher XVI, 1781, p. 51). The former is evidently *S. gæderopus* Linné. The latter must be the common spiny species of the West Indies commonly known as *S. americanus* Lamarck, for which Doctor Dall (Trans. Wagn. Inst. III, part iv, 1898, p. 759), after a consideration of the extensive synonymy, adopts the name *S. echinatus* Martyn, 1784, which apparently should now give place to *S. americanus* Hermann, 1781.

TURBO CANALICULATUS, Hermann.

Der Naturforscher, XVI, 1781, p. 52, Pl. ii., fig. 1.

This species is clearly the ordinary large *Turbo* of the West Indies, usually known as *T. spenglerianus* Gmelin. The latter author, though he cited Hermann's work (Syst. Nat., xiii, 1790 p. 3571), made the double error of using his name in another sense and of bestowing a subsequent name upon Hermann's species. Both the species termed *Turbo canaliculatus* by Gmelin and Kiener respectively, are Oriental.

NERITA CANCELLATA, Hermann.

Der Naturforscher, xvi, 1781, p. 56, pl. ii, fig. 8. 9.

Here again Gmelin has misunderstood the work of Hermann. After quoting (p. 3670) the above reference, he adds from Chemnitz accounts of two distinct shells, the one *Natica sulcata* Born, a West Indian *Natica*, the other *Vanikoro cancellata*, Lamarck. In his turn Lamarck was thus led to confound these species, a confusion which was unraveled by Deshayes, (An. s. vert. [2] viii, 1838, p. 644). Hermann's illustration well represents *Nerita sulcata*, Born (Index Mus. Caes. Vind., 1778, p. 416, Pl. 17, fig. 5, 6), which is maintained by three years' priority.

BUCCINUM SOLUTUM Hermann.

Der Naturforscher, XVI, 1781, p. 53, Pl. ii, fig. 3, 4.

Dr. W. H. Dall kindly gave us the benefit of his wide knowledge of this boreal group. Hermann's figure appears to him to represent a short form of *Chrysodomus heros* Gray (Proc. Zool. Soc. 1850, p. 14, Pl. VII) a species erroneously united by Kobelt, Conch. Cab. Fusus, 1881, p. 61, to *Neptunea fornicata* Gray non Gmelin. Hermann's name should therefore be maintained.

BUCCINUM STROMBOIDES Hermann.

Der Naturforscher, XVI, 1781, p. 54, Pl. ii, figs. 5, 6.

This has been recognized as a fossil from the Paris basin and was used by Mörch (Journ. de Conch. VIII, 1858, p. 43) as the type of the genus *Cryptochorda.*

MUREX DESPECTUS Linnê.

Hermann, Der Naturforscher, XVI, 1781, p. 54, Pl. ii, fig. 7.

Here Hermann professes to figure a sinistral *Chrysodomus despectus* but Dr. Dall points out to us that the illustration better suits a sinistral *C. antiquus.*

A NEW SPECIES OF ANCULOSA.

BY A. A. HINKLEY.

ANCULOSA MINOR, n. sp. Pl. 1, figs. 7, 8.

Shell small, depressed, thick, light olive in color, whorls five, those of the spire flat; periphery angulate or carinate; lines of growth fine and cut by fine revolving impressed lines, giving the surface of the shell a reticulate appearance under the microscope; peristome straight and thin; aperture ovate, columellar callus thick, wide, dark colored or white, extended across the parietal wall; umbilical region indented. Three specimens measured length 33, diam. 27, length, 30, diam. 24, and length 30, diam. 25 hundredths of an inch.

Habitat—near Florence, Alabama, in the Tennessee river, near the south bank, in a shaded situation where there was but little current and a good many leaves in the water and on the bed of the stream. A. A. H. Nov. 10, 1904. Cotypes in coll. Hinkley and A. N. S. Phila. (No. 105866).

This little species has been referred to *Anculosa carinata*, but I am sure they are distinct; compared with that species they are smaller, thicker, spire not as elevated, aperture more regular oval and the columellar callus thicker. From *A. costata* it differs in being more elevated, thicker, whorls flat and suture linear, aperture smaller.

The young of this species is very much like the young of *A. crassa* Haldeman, but are more elevated, have no bands and the impressed lines are more strongly marked; nor does *crassa* have the second carina. The young are quite close to those of *A. praerosa* and *tintinnabulum* (see the Nautilus vol. 21, page 110, plate 10, figures

1, 7, and 8) *A. minor* is a little more elevated than the former, has 5 flat whorls and the space between the carinæ is on the same plane as the rest of the base of the shell, the revolving impressed lines are more prominent than on either of the above species, the mature shell has more in common with *A. melanoides*, but that species is more elevated with no carina or impressed lines.

A NEW FLORIDIAN VIVIPARUS.

BY H. A. PILSBRY AND C. W. JOHNSON.

VIVIPARUS WALKERI n. sp. Plate III, figs. 6, 7.

The shell is perforate, moderately solid, globose-conic, dull yellowish-brown, lighter beneath, with three or four very indistinct purplish-brown bands, or dull purplish-brown without bands; faintly striated. Spire short, much eroded and whitish in adults, which retain about 3 whorls. Whorls very convex, somewhat flattened horizontally below the very deep suture. The aperture is large, slightly oblique, ovate, livid and showing the bands within by transmitted light, when any are present.

Length 26, diam. 22, length of aperture $16\frac{1}{2}$ mm.

Length 26, diam. 21, length of aperture 15 mm.

Types no. 70,053 A. N. S. P., collected by Pilsbry and Johnson in Juniper Creek, Lake County, Florida, 1894.

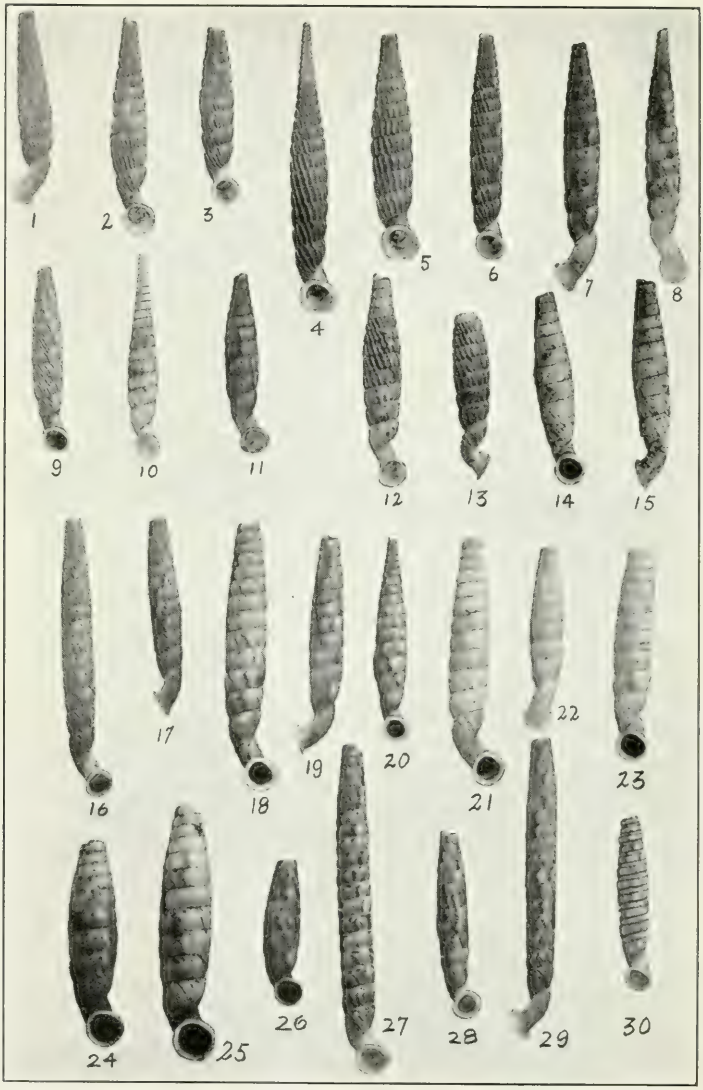
This species differs strongly from other Viviparas of Florida by its broad, short form. It was taken in considerable numbers in the type locality, but was not found elsewhere. *V. waltoni* Tryon is the prevalent form in Lake George, and *V. georgianus* in the St. John's River. It is named in honor of Mr. Bryant Walker, whose work on fresh-water shells is well-known to readers of THE NAUTILUS.

NOTES.

WE have to record the recent death in Honolulu of the veteran Hawaiian conchologist, D. D. BALDWIN. A sketch of his life and work will be given later.

MR. CHARLES HEDLEY of the Australian Museum has been studying the museums of this country during June and July.

MESSRS. J. B. HENDERSON, JR., and GEORGE H. CLAPP have returned from a cruise in the western Bahamas on the yacht *Eolis*. DR. PAUL BARTSCH has also visited the Bahamas on the Carnegie Institution yacht *Anton Dohrn*.



TORRE: CUBAN UROCOPTIDÆ.
(× 2)

The Nautilus.

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NOTES ON THE VALIDITY OF HELIX (EPIPHRAGMOPHORA) OREGONENSIS LEA.

BY HENRY M. EDSON.

[The article following is probably the last written by Mr. Edson whose untimely death was recorded in The Nautilus for March, p. 132.]

This species seems to be recognizable, but has been buried for a long time in the synonymy of *Epiphragmorphora dupetithouarsi* Desh. It was described by Dr. Lea[1] in 1836 from specimens collected by Mr. Nuttall in Oregon; after a careful reading of the original description and comparing it with Pfeiffer's description of *mormonum* I am convinced that *Epip. mormonum* is synonymous.

The type locality of *mormonum* was Mormon Island in the American River in Sacramento Co., Cal; it has also been collected at Redding, Shasta Co., by McGregor,[2] in Tuolumne Co., by Hemphill,[3] and at Klamath,[4] Oregon. Dr. Lea's description of *oregonensis* follows, "Shell subcarinate, thin, smooth, reddish-brown, double-banded on the carina, above slightly convex, below somewhat inflated; Habitat, Wahlamet near its junction with the Columbia River; Diam., 6, Length .4 of an inch."[5]

Dr. Lea also states that the specimen was immature so that of course the description would be somewhat defective. "That part of the

[1] Lea Obs. Vol. II, 1836, p. 100.

[2] Nautilus, XIII, 1899, p. 64.

[3] Nautilus, XIII, 1899, p. 128.

[4] Washington State Museum, fide H. Hannibal.

[5] Diam. 15 mm., Alt. 9 mm.

specimen which has the epidermis presents in it, under the microscope, a remarkable waved appearance." He also says, "shell subcarinate," and his figure[1] shows it to be so. This feature alone would eliminate *Epip. dupetithouarsi*, for although the very young shells of *dupetithouarsi* are planulate the whorls are always rounded and especially in a shell of the size of Dr. Lea's specimen, which must have been over half grown. This taken with the subsequent collection of *mormonum* Pfr., at Klamath, Ore., which is close to the original locality of *oregonensis*, and the fact that Dr. Lea also described *Polygyra townsendiana*,[2] from the same locality at the same time, makes it pretty certain that *Helix mormonum* Pfr. was the shell Dr. Lea described, and not a specimen of *dupetithouarsi*; While Dr. Lea's description was based on an immature shell I consider it quite recognizable, as Nuttall was not likely to confuse his localities, and *dupetithouarsi* does not by any chance get so far north. Dr. Lea described *Helix oregonensis* in 1836; it thus has precedence of *mormonum* Pfr. by twenty-one years, as Dr. Pfeiffer did not describe *mormonum* until 1857.

The synonymy would stand as follows:

1836. *Helix oregonensis* Lea, Obs. II, p. 100, xxiii, fig. 85; Pfeiffer Mon. Hel. Viv., I, 1848, p. 428.

1857. *Helix mormonum* Pfr., Proc. Zool. Soc., 1857, p. 109; Mon. Hel. Viv., iv. p. 276; Fischer & Crosse, Moll. Mex. et Guat., 1870, p. 251.

1885. *Arionta mormonum*, W. G. Binney, Manual Amer. Land Shells, Bull. 28, U. S. N. M., p. 14.

1897. *Epiphragmophora mormonum* Pfr., Pils. Naut. xi, p. 48. Keep, West Coast Shells, 1911, p. 277.

NOTE.—As the type of *Helix oregonensis* Lea is now in the U. S. National Museum we requested Dr. Paul Bartsch to compare it with *mormonum* in view of the identification advocated by Mr. Edson. He writes as follows. "I have been looking over Mr. Edson's manuscript and also Lea's type of *Helix oregonensis*. I consider that *oregonensis* has nothing to do with *dupetithouarsi* Desh. The latter species in the young stage has a well rounded periphery, while in *oregonensis* we have a strong keel at the junction of the dark and

[1] Lea Obs. II, 1836, pl. xxiii, fig. 85.

[2] Lea Obs., II, 1836, p. 99.

light band. The anterior light band is about as wide as the dark. The posterior one is scarcely indicated, being represented by a mere line. The nepionic whorls of the two shells are also different: that of *oregonensis* being papillose while that of the *dupetithouarsi* is wrinkled. The young *oregonensis* is also much larger considering the same number of whorls in the two species. Then too, the sculpture of the adult whorls is quite different; in *oregonensis* we have a surface which is covered by a crinkly epidermis, the crinkles placed obliquely. The lines of growth are irregular and not well marked, while in the *dupetithouarsi* we have regularly impressed lines and none of the crinkled epidermis, the latter being smooth; *dupetithouarsi* has a well-rounded spire while in *oregonensis* it is flattened, etc. I believe that *oregonensis* comes nearer to the group of *E. mormonum* than *E. dupetithouarsi*, You have the types of *cala* and *buttoni*, so I will leave the comparison of them with you."

It seems from the above that we will have to write *oregonensis* in place of *mormonum*, but whether Lea's name applies to the typical middle Californian *mormonum* or to one of the described subspecies remains in doubt. Adult specimens from Oregon are needed to settle this question.

H. A. P.

LAMPSILIS VENTRICOSA (BARNES) IN THE UPPER POTOMAC DRAINAGE.

BY A. E. ORTMANN.

Some time ago the writer reported (Mem. Carnegie Mus., 2, 1906, p. 373) that a western species of crawfish, *Cambarus obscurus* Hagen, is found in the Potomac drainage, in Wills Creek, at Ellerslie, Allegany Co., Md., and Hyndman, Bedford Co., Pa. This fact was discussed on p. 445 (l. c.), and explained in general terms as an "artificial introduction by human agency." I may add that this crawfish apparently has increased in numbers since its first discovery (August 10, 1904, and May 8, 1905), for on September 7, 1909, I found it very abundantly at Hyndman (for about a mile in the creek above the tannery). And further, on May 6, 1912, this species was seen in the South Branch Potomac at Romney, Hampshire Co., W. Va. Although only a cast-off shell was found, this was of a male of the first form, and positively established the presence of this species at this locality.

A case parallel to this has now come to light: the presence, in the Potomac system, of a western mussel, *Lampsilis ventricosa* (Barnes). This is a form common, for instance, in the Ohio drainage in western Pennsylvania and West Virginia, but it is *not* found in any of the Atlantic river systems investigated by the writer (Delaware, Susquehanna, James). The following records are at hand:

September 4, 1909. Potomac River, Hancock, Washington Co., Md. Here it was in the smaller branch of the river in great numbers and in all sizes, from 41 mm. long upward. About two dozen were taken.

May 9, 1911. South Branch Potomac River, Southbranch, Hampshire Co., W. Va. About a dozen were found within the first mile of the South Branch above its junction with the North Branch. All were of medium size.

August 16, 1911. Shenandoah River, Harper's Ferry, Jefferson Co., W. Va. A single male was found, below medium size.

May 6, 1912. South Branch Potomac River, Romney, Hampshire Co., W. Va. About a dozen were found in a very small branch of the river. Some were rather large, but most of them were quite small (smallest 20 mm. long). These small ones were found all together in fine gravel at the head of a riffle, in shallow water, attached to small pebbles by their byssus.

In other parts of the Potomac drainage, thoroughly investigated, this species was *not found*, and this is especially true for the headwaters of the Shenandoah River and the northern tributaries of the master stream (Antietam, Conococheague and Great Tonoloway Creeks in Pennsylvania and Wills Creek in Maryland).

It is probable that this species will turn up elsewhere in the Potomac. The localities known at present are all to the West of the Blue Ridge Mountain, that is to say, within the Great Allegheny Valley and the Allegheny Mountains. It should be noted, that its representative Atlantic form, *Lampsilis cariosa* (Say), which is so common in the Delaware and Susquehanna, is not found in this region, but is present farther below in the Potomac: I have specimens from Cabin John, Montgomery Co., Md.

There is no question that we have to deal with a form of *Lampsilis ventricosa*. It is true that the Potomac form represents a peculiar type in so far, as all the specimens collected are rather uniform in shape, but the same shape is frequently met with in western speci-

mens, although there is a much greater range of variation in the latter. The Potomac specimens are rather high and short, and their size remains far below that of western *ventricosa*. My largest specimen (a male from Hancock) is 114 mm. long, 82 mm. high, and 58 mm. in diameter, while I have many individuals from western Pennsylvania, which are 150 mm. long and over. Further the posterior ridge of the shell is in the Potomac form a little more distinct than in the average of the western specimens, but again in this character there are western specimens, which agree with the eastern.

In all other particulars the two forms agree, and also the color and color markings (rays) of the epidermis are the same, and quite variable. But on account of the small size, the shorter and higher outline, and somewhat more distinct posterior ridge, we might regard the Potomac-race as a variety, which I propose to call: *Lampsilis ventricosa cohongoronta* (an old Indian name of the Potomac). I may add, that I have investigated the anatomy, of males, sterile and gravid females, and that there is no difference whatever. Also the glochidia are the same.

It is evident that this shell is, zoögeographically, out of place in the Potomac, and, considered together with the case of the western crawfish mentioned above, we must conclude that both are artificial introductions into this river, probably quite accidental, and the idea is suggested that *the shell might have been transported in the larval stage, as glochidium, during its parasitic life upon certain fishes.* Western species of fishes have repeatedly been transplanted into the Potomac system. H. M. Smith and B. A. Bean (Bull. U. S. Fish Comm. 18 (or 1898) 1899 pp. 179–187) mention no less than seven species (disregarding four European), and among them are the following: Rock Bass (*Ambloplites rupestris* (Raf.)), Large mouth Black Bass *Micropterus salmoides* (Lac.), and Crappie (*Pomoxis annularis* Raf.).

Now just these have recently been given by G. Lefevre and W. C. Curtis (Bull. Bur. Fisheries, 30, 1912, pp. 157 and 160) as most susceptible to infection with the glochidia of species of *Lampsilis*, among them *Lampsilis ventricosa*. The introduction of Black Bass was in the Shenandoah River in 1889; that of the other two fishes in various parts of the Potomac and the Chesapeake-Ohio Canal chiefly in 1894. I do not hesitate to attribute to this fact, the transplantation of certain western fishes, the accidental introduction of

glochidia of this mussel, which found in this region congenial environment, and thus the mussel became established and is propagating. In the western waters, *L. ventricosa* prefers similar ecological conditions: rivers and streams of medium or small size, with riffles and rapidly flowing water, and gravelly bottom.

Very likely the same cause accounts for the accidental introduction of *Cambarus obscurus;* in seining for bass, for instance, in western Pennsylvania, it would be quite impossible *not* to catch a number of this crawfish.

This is an interesting instance of the stocking of a stream with a mussel species by the help of fish. Lefevre and Curtis (l. c., p. 192) discuss this way as a possible means of mussel transportation; however, they express some doubt as to its practicability. But here we have, apparently, the demonstration that this *is* possible, and having happened once quite by accident, it is to be expected that it also might be successfully accomplished when intended and done with the proper care.

NEW ENGLAND NOTES.

BY REV. HENRY W. WINKLEY.

A careful search at Wood's Holl and Chatham, on Cape Cod, reveals more specimens of the species described as *Pyramidella* (*Sulcorinella*) *bartschi.* These have been compared with the type by Dr. Bartsch as well as myself, and they show it to be an *Odostomia.* The name is therefore changed to *Odostomia* (*Evalea*) *bartschi.* Mr. W. F. Clapp has also found it within the cape.

Short trips to a few points reveal *Odostomias*, and their distribution should be noted. The four species, *Odostomia trifida*, *bisuturalis*, *winkleyi* and *P. fusca*, are to be found at low tide in inner waters as follows: In a small creek in the marsh near the station at Rowley, Mass. (This same spot is the most northerly locality where I have found *Paludestrina salsa.*)

At old Newbury, Mass., in the Parker River, in eel-grass patches, is another colony. The third is in Great Bay, New Hampshire, at a spot half way between Dover and Portsmouth.

Last summer I obtained the best lot of *Pyramidellidæ* I have ever seen. My stay at Chatham was short, and confined to low-tide col-

lecting. One small area revealed excellent specimens of *P.* (*Syrnola*) *fusca* and *producta*, with one specimen of *winkleyi*. At Wood's Hole I found much material of species already recorded and a few of *Turbonilla verrilli*. I also got a good series of *Turbonilla sumneri*. *Eulima stenostoma* and *conoidea* occur at Wood's Holl, and a few specimens of *Tellimya ferruginosa* were found at the locality where Verrill located them years ago. While *Turbonilla* is ordinarily to be found only by dredging, it does occur at some places at low tide. A chance to observe leads me to think it is a burrowing shell, hence collectors will do well to sift sand in seeking this form. Another suggestion for collectors is, watch carefully for *Eulima*. I accidentally discovered in sifting that *E. stenostoma* after being sifted from the mud has a tendency to float on the surface of the water, as does also *Solenomya*. In working at low tide and sifting there is a temptation to float off dead eel grass, leaving the shells at the bottom of the sieve. Watch carefully, lest *Eulima* floats away.

A trip made the day before writing this revealed a few *Odostomia trifida* in the creeks back of Nantasket Beach, Mass. I cannot too strongly urge on field workers the duty of sweeping with a dip-net in places where eel grass abounds, and be sure to take at least an inch below the surface of the mud or sand in which it grows. Shells are abundant there, and occasionally rare forms, *Odostomia gibbosa*, for example, of which I obtained two more specimens last summer.

NEW CUBAN UROCOPTIS OF THE U. CINEREA GROUP.

BY DOCTOR CARLOS DE LA TORRE.

Urocoptis (*Gongylostoma*) *cinerea* Pfr. Plate vi, figs. 14, 15.

This species has hitherto been known only from the original description in the Conchylien Cabinet and its copy by Pilsbry in the Manual, xv, page 273. The exact locality of its occurence in Cuba has also been unknown, collectors apparently having missed it. In my recent conchological excursions through the central part of the island I obtained it both in its typical form and through a series of varieties and mutations which appear to define a natural group containing a number of species and subspecies.

Specimens agreeing closely with Pfeiffer's description generally

have 9–10 whorls; if the shell is entire (rare) there are 22–24 whorls, the two embryonic ones being smooth, corneous and somewhat bulbous. The radula formula is 7.2.1.2.7, there being 19 teeth in each transverse row; the inner two laterals on each side are much larger than the others, the third tooth becoming abruptly smaller than the second; the outer laterals are capped with a low ledge in place of cusps. The internal axis of the shell is encircled by a low thread below, which in the upper whorls is lamelliform and bears very delicate filament-like spines. This last character determines the position of this species in a group along with *U. wrighti*, *baculum* etc., although the radula frequently indicates the Section *Teterentodon*.

Central Cuba on walls and stones at Cerro de Guajabana near Caibarien, Santa Clara Province.

Urocoptis (*Gongylostoma*) *livida*, *n. sp.* Plate vi, figs. 21, 22.

Shell slenderly fusiform, somewhat swollen in the middle third, tapering to a narrow truncation above; livid-colored, fleshy above and bluish or purplish below. Surface glossy, sculptured with obliquely subarcuate riblets *not flattened on the lower whorls*. Remaining whorls 10–12, somewhat convex, the last free in a descending curved neck scarcely carinated. Aperture as in *U. cinerea* but paler within. The spiral thread of the axis is stronger and perceptibly spinose in the middle and upper whorls.

Longitude 16, diameter 2.7, aperture diameter 2.1, whorls $11\frac{1}{2}$.

Longitude 17, diameter 2.9, aperture diameter 2.3, whorls 12.

Longitude 12.5, diameter 2.2, aperture diameter 2, whorls 11.

Central Cuba: On walls and large stones at El Palenque de Taguayabon and La Puntilla, near Remedios in the Province of Santa Clara.

This species differs from *U. cinerea* Pfr. by its more fusiform shell, livid color, glossy surface and by its regular sculpture; also by its stronger internal axis.

Urocoptis livida occulta n. subsp. Plate vi, fig. 23.

Differs from the type in sculpture and color; the surface is glossy and nearly smooth, the riblets being obsolete in the middle whorls but well raised on the free curved neck; the color is livid pinkish above and violet below with scattered corneous streaks, peristome white.

Longitude 15, diameter 2.9.

Longitude 12, diameter 2.3.

Longitude 13, diameter 2.5.

Central Cuba: Under stones at the sides of the road between Remedios and Taguayabon in the Province of Santa Clara.

Urocoptis (*Gongylostoma*) *pallidula* n. sp. Plate vi, figs. 18, 19, 20.

Belonging to the *cinerea* and *livida* group, it differs in its sculpture and color; the surface is obliquely subarcuately striate, the delicate striæ being closely spaced to the last whorl, where they become coarser and more widely spaced riblets; the color is fleshy to pale yellow, with scattered corneous streaks, sometimes bordered with an opaque white patch. In general shape, though slightly fusiform, it resembles typical *U. livida* with its descending curved neck and moderate aperture. The internal axis is somewhat sinuous, and the lamelliform spiral thread is well developed for this group, lying near the base in each whorl.

Long. 18.3, diam. 3, ap. diam. 2.6, whorls 13.

Long. 15, diam. 2.4, whorls 13.

Long. 15, diam. 2.2, whorls 20 (entire).

Central Cuba: On walls and stones at Mogotes de las Jumaguas, very near Sagua la Grande, in the Province of Santa Clara.

Urocoptis (*Gongylostoma*) *fortiuscula* n. sp. Plate vi, figs. 24, 25, 26.

Resembles *U. livida occulta* in color. The median whorls are finely striate, but it differs from the last in its stronger and rather swollen shell, the last whorl less or not at all descending, and the aperture being larger. The internal axis is slightly sinuous and the lamelliform spiral thread is near the base, as in *U. pallidula*.

Long. 17.5, diam. 3.8, ap. diam. 3, whorls 11.

Long. 14.5, diam. 3.2, whorls 9½.

Some specimens from the same locality are much smaller:

Long. 10, diam. 2.6, ap. diam. 2, whorls 8.

Long. 12, diam. 3, whorls 9.

Central Cuba: On and under stones at Casimba de Buenavista, district of Malpaez near Sagua la Grande, in the Province of Santa Clara.

Urocoptis (*Gongylostoma*) *bacillaris* n. sp. Plate vi, figs. 7, 8.

Slenderly fusiform, somewhat swollen in the middle third, taper-

ing to a narrow truncation above; thin, pale corneous, profusely variegated with cream-white and having pale brown streaks. Surface glossy, sculptured with rather strong and oblique sinuous riblets, separated by wide intervals; suture subcrenulate. Whorls 12–15, somewhat convex, the last free in a moderately long descending curved neck. Aperture subcircular, a little oblique, the peristome white, sometimes brownish below, expanded and somewhat reflexed throughout. Axis encircled by a thread-like lamella, spinose in the median and upper whorls, and a low spiral cord above it; in the last two whorls the axis is simple and sinuous.

Long. 17, diam. 2.8, ap. diam, 2.3, whorls 14½.

Long. 13.8, diam. 2.2, whorls 13½.

Central Cuba: On stones at the Sierra de Matahambre y Tatibonico, and Veredas de Aguada y del Chorreron, in the mountains near Las Llanadas, district of Mayajigua, in the Province of Santa Clara.

Related to *U. contentiosa* Ar., but differs by its sinuous and more widely spaced riblets and by the free and descending last whorl.

Urocoptis bacillaris exilis n. var. Plate vi, fig. 10.

Smaller than typical *bacillaris;* slenderly fusiform, often entire, the upper two-thirds conspicuously attenuate to the bulbous apex, the lower part somewhat swollen; paler, variegated colored, sculptured with oblique and sinuous thread-like riblets, suture subcrenulated. Whorls 22–24 in the entire shell, 12–13 in the truncated specimens, a little convex. Axis twisted and encircled by a delicate spiral thread, spinose above.

Long. 14.7, diam. 2.1.

Central Cuba: On stones at Vereda le los Negros, a road between La Legua and Tatibonico, district of Mayajigua in the province of Santa Clara.

NOTE ON THE GENUS SEPTA PERRY (TRITON AUCT.).

BY WM. H. DALL.

A recent article in the Victorian Naturalist (Australia) by Messrs. Mathews and Iredale, on the hitherto unnoticed *Arcana* of George Perry, shows that another change is necessary in the nomenclature of this genus. It appeared that although Perry states in his "Con-

chology" that several of his genera are "for the first time published" in that work (the text of which probably was written first), yet some of them actually appeared in print a year earlier in his short-lived journal called the "Arcana." Among these was *Septa*, which appeared in connection with the single species *Murex rubecula* Linné, which of course must be taken as the type. Perry's idea of his genus doubtless was that it covered the species called *Triton* by Lamarck, and so, in intent, it is a synonym of *Cymatium* Bolten, 1798. On account of the character of the type however, it might be retained as a section for the species I formerly ranked under *Lampusia* Schumacher, 1817.

The first name available for the group typified by *Murex tritonis* L. seems to be *Nyctilochus* of Gistel, 1848, and if, in accordance with usage, we take this as the typical genus of the family, the family name would be *Nyctilochidæ*. The genus *Aquillus* Montfort, 1810, upon which the family name was based by Dr. Pilsbry some years ago, is unfortunately synonymous with *Cabestana* Bolten, 1798, and therefore cannot be used.

NOTES.

Polygyra palliata Say in New England.—The occurrence of this species in New England has for a long time needed verification. Repeated search in the Berkshires and Green Mountains by the writer has failed to reveal its presence, although the other species with similar distribution have been found. C. B. Adams, in Thompson's History of Vermont, p. 159, 1842, says: "It is seldom found in Vermont." W. G. Binney includes the species in the "Invertebrata of Massachusetts," but gives no locality. In July Messrs. G. M. Allen and W. S. Brooks while trapping for small mammals on Mt. Ascutney, Vt., obtained three specimens, one adult and two young; the latter were found feeding on the wet oat-meal used in baiting the traps. It is somewhat surprising that this species should turn up at last in this more isolated peak in the Connecticut Valley and not in the Green Mts. proper, although there is little doubt but that it will be found there with more thorough collecting.—C. W. Johnson.

The University of Michigan has conferred the honorary degree of Doctor of Science upon Mr. Bryant Walker, of the class of 1876, in recognition of his valuable work on mollusks.

Snail Trap.—"A woman whose garden was being overrun with snails wrote to the Bureau of Agriculture at Washington for a remedy. She was told to put large pieces of cut raw potato on the under side of a board, raised at one end a few inches from the ground. This she did, with the result that in one week a thousand snails had collected in that one spot."

PUBLICATIONS RECEIVED.

New Species of Land-shells from the Panama Canal Zone.—By William H. Dall. Smiths. Misc. Coll. vol. 59, no. 18, July 27, 1912.

Pleurodonte (*Labyrinthus*) *goldmani* and *Plekocheilus pirriensis* are described as new. The latter is a large and fine form related to *P. coloratus* of Colombia. Not having seen the specimens I may be wrong, but *P. goldmani* does not appear distinct from *sipunculata* Forbes, which I have ranked as a variety of *P. otis*. The specimen figured as *P. labyrinthus* Desh. seems to be what I described as *P. otis orthorhinus*. It is not *labyrinthus* Dh., which is the same as *P. otis* Sol. H. A. P.

The American Species of Sphyradium, with an inquiry as to their generic relationships. By G. Dallas Hanna. U. S. Nat. Mus. Proc. vol. 41, pp. 371–376. The type species, *S. edentulum* Drap. (*Vertigo simplex* Gld.) has been dissected by Mr. Hanna, who shows that by the direct ureter and genitalia it belongs to the *Pupillidæ*, closely resembling *Vertigo*. The jaw however is composed of 16 overlapping plates, as in *Punctum*. The classification proposed by Dr. Sterki and generally adopted recently will therefore give way to the old view that *edentulum* is a Pupoid snail. Until *Punctum* can be examined, its position must be held in suspense. If the foot has pedal grooves, it will remain in *Endodontidæ*. Otherwise it may be a helicoid form of *Pupillidæ*, but this does not seem likely. Mr. Hanna gives *S. alticola* Ingersoll specific rank, and describes a new form from the Pleistocene of Kansas as *S. hasta*. It is nearly 6 mm. long.

It may be mentioned in this connection that the name *Sphyradium* is not tenable for this group, which must be called *Columella*. The argument in the case will be given in a monograph of New York shells now in preparation.—H. A. Pilsbry.

THE NAUTILUS.

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THE MUSSEL SHELL BEDS NEED PROTECTION.

BY WILLIAM T. BARRET.[1]

I began in the mussel shell business in the season of 1902 on the Ohio river at Henderson. Ky.; have been in it ever since that time, and have done practically all of my work on the Ohio. The first five years I never worked above Louisville, finding all the shells that we could sell in that territory, that is, from Louisville down. The beds were large and very productive. I have known from 50 to 60 boats to work on one bed, and some beds produced from 3000 to 5000 tons of shells before they were whipped out. What I mean by being "whipped out" is, that there are not enough shells left to pay wages for catching them. A mussel catcher could work faithfully for 10 hours and not catch over a box of shells on these beds. The price for catching is from 25 to 40 cents per box. The price depends on the quality of shells caught. These boxes will hold about 100 pounds of cooked shell.

In the early days the mussel catchers caught from 10 to 15 boxes per day on these beds. As this territory became less productive, it was necessary for me to find new territory where shells were more plentiful. I came to the upper Ohio, and with camps scattered along the river, have worked it from Louisville, Ky., to Parkersburg, W. Va., the last four years. There may be some wild beds left, but there are very few, if any.

[1] From a memorial addressed to the General Assembly of Kentucky.

The Ohio has been worked hard from one end to the other, and if the present system of working the beds continues, in two or three years, they will all be "whipped out." Under the present system you can work where you like, so naturally everybody likes to work where the mussels are the thickest, and the catchers keep right after them until they whip the bed out.

I remember when the bed at Shawneetown, Ill., was found, and it was one of the best ever found on the river. The mussel catchers working on the Wabash river in Indiana heard what a fine bed it was, and came out of the Wabash, floated down the Ohio to Shawneetown until there were over 100 boats at work on that bed. They worked it out in a few weeks. Since that time it has been worked some each year, but has produced very little. It was found seven years ago and produced that season about 2000 tons of shells, and the total production since that time will not exceed 200 tons in the seven years.

Over 25 per cent. of the mussel shells caught in the Ohio river today are practically wasted—they are so small that the cutters in the blank factories, who work by the piece, can't make anything cutting them, so naturally they throw them in the waste shell if the foreman of the shop isn't standing right by looking. In most shops they work as many as 100 cutters, and one foreman; so you see he can't see many.

My idea is that the State, through its Legislature, should take control and regulate the number of boats per mile that work these beds. I think that four boats to the mile would be about right and only allow them to catch 15 tons to the boat. In other words, confine the production to 60 tons to the mile of shell beds per year.

There are about 90 miles of shell beds in the Ohio river in Kentucky's boundary from Cattletsburg to Cairo, and equally as many in her tributaries. This would mean a production of from 5,000 to 10,000 tons per year. This production would save the mussel beds, and they would continuously consume the sewerage, thereby purifying the water, and would insure from 5,000 to 10,000 tons of raw product annually for the button factories of this country.

The Legislature could pass a bill granting the State the right to protect the beds by license for a term of years, say on a royalty basis of $1.00 per ton for all workable shells produced. This would give the state a revenue from this source of from $5,000 to $10,000 per

year, and it would be handled without any expense to the state. The State Auditor should be given the power to make a contract along the lines mentioned for their protection. The contracting party could be required to send an invoice of each shipment monthly, together with check for royalty to the Auditor, thereby saving the State any expense. The books to be always open for inspection, and a bond given the State that will guarantee this contract to be carried out to the letter.

The Legislature in making a law giving the State this right should embody in it all the things necessary to protect the mussels and mussel beds, viz.: That 60 tons of button shells to one mile of mussel bed is all that can be taken out in one year; this to apply to beds of less than a mile proportionately, one-quarter of mile, 15 tons; one-half mile, 30 tons, etc. No dredges of any kind, or oyster tongs should be allowed—nothing but the hook that catches the mussel as an individual. And the hook should not be allowed to work on any mussel beds when there is more than 20 feet of water on the nearest government gauge. When there is more water than this, the current is much stronger and drags the hooks over the beds so fast that they often catch into the mussel itself, thereby killing it and losing the shell entirely. I have seen boats working in high water that would pull up as many as 25 of these mussel meats at one time. This is ruinous to a mussel bed.

The catchers like to work on high water because there is more food in the water for the mussel at that time, and consequently more mussels come to the surface to feed, and they can catch them faster. There should be a fine of not less than $25.00 nor more than $50.00 and 30 days in jail for each offense for any one violating any of these laws. Each county should have legal jurisdiction to prosecute.

First Step Toward Protection.—Iowa is the oldest state in experience with the mussel-shell button industry. The first factory was started at Muscatine about 16 or 18 years ago. They got the shells from the upper Mississippi river, and for several years found sufficient quantity there to run their plants. As the business increased, it became necessary for them to hunt new fields. They have continued to do this until to-day the Mississippi river and all its tributaries have been worked and worked without any idea of protecting the mussel beds.

The button industry has made tremendous strides—9 years ago

consumption of shells by the button factories was from 10 to 12 thousand tons—to-day the consumption of a normal year will exceed 100 thousand tons. The State of Iowa has seen how necessary it was to do something to insure the raw product for the button factories. To this end through their Congressmen they got the Federal Congress at Washington to appropriate money for the protection of the mussel. With this money they have established at Fairport, Iowa, a mussel hatchery, where they are experimenting and trying to raise the mussel in ponds. They realize the necessity of producing the shells.

Instead of working the mussel beds until we are forced to hatch, cultivate and raise them, why not protect the wild beds that we have, and harvest the crop that they produce annually?

There is no doubt but this is the better way; and Kentucky has in its boundary the major portion of the Ohio river with 90 miles of shell beds. Protect them and save this raw product for the button industry. It is valuable to Kentucky and to the whole world. This is the right way—take the lead, and the other states will follow.

FRESH-WATER MOLLUSCA LIVING OUT OF THE WATER.

BY V. STERKI.

Aplexa hypnorum (L.) and *Sphærium occidentale* Pme. are well known examples of mollusks living at places where water stands only during part of the year, often for short periods in spring, and occasionally after heavy rains. The last named species appears to be especially well adapted to that kind of habitat, and even recently discharged young mussels have often been found living on apparently quite dry soil under a thin layer of dead leaves. It is also known that small *Lymnæa*, and *Pomatiopsis* are ofter found crawling out of water.

Fresh-water mollusks of almost all groups bury themselves in the soil, with the disappearance of surface water, and survive for shorter or longer periods. But quite a number of pulmonates and branchiates appear to remain not only alive but active and propagating for long periods or permanently. How much this fact has to do with

the evolution of terrestrial life from aquatic, and what physiological, and eventually anatomical and embryonic changes are involved, must be left to the scientists.

The following observations may be worthy of notice in this connexion.—In low woods, north of Geneva, Ohio, *Segmentina armigera* (Say) were found alive in company with *Sphær. occidentale*, and in the same woods *Physa gyrina* were found, then mostly dead shells, where they could not have been transported from any permanent body of water.

In damp woods at Kenmore, Summit Co., Ohio, among patches of various terrestrial mosses, a few dozen *Amnicola limosa* Say (*A. parva?*), living and of various ages, were found (late August), and with them a few puerile *Physa* apparently *sayi* Tappan. No water was standing in the woods, even after heavy rains, and moreover these snails or their parents must have survived e. g. the exceptionally hot and dry summer of 1911.

In July of that summer, in a marsh near Hudson, Ohio, which had been dry as a bone for weeks, like hundreds of others, Dr. Rush and I found several dozen specimens of *Lymnæa* apparently *lanceata* Gld., living and in good condition, clinging to stems and leaves of sedges (*Carex* and *Scirpus*), several inches above the ground. There is hardly a doubt that they had been gathering all the moisture they could from dew at night.

In woods of that vicinity we found *Pisidium abidtum subrotundum*, typical, full-grown to young, under dead leaves in a damp spot. Other *Pisidia* have been found at similar places, and also in swamps among mosses, out of water, and even on steep banks where water could never be standing.

Small *Lymnæa*, apparently *parva* Lea, are often found in greenhouses, on mossy flowerpots, sometimes in large numbers, evidently doing well and propagating.

Similar observations have doubtless been made by other malacologists.

NEW CUBAN UROCOPTIS OF THE U. CINEREA GROUP.

BY DOCTOR CARLOS DE LA TORRE.

(*Concluded from page 58*).

Urocoptis bacillaris albicostulata n. subsp. Plate vi, fig. 9.

This species differs from the type and its other varieties in the sculpture of stronger white thread-like riblets.

Long. 18.2, diam. 2.9, whorls 17.

Long. 12.9, diam. 2.1, whorls 13.

Central Cuba: On stones at Cueva Bonita and Rosa Perdida in the northeastern limit of the Santa Clara Province.

Urocoptis bacillaris sordidula n. subsp. Plate vi, fig. 11.

This is the smallest of the *bacillaris* race. It is slenderly fusiform and truncate above, corneous and whitish streaked but the surface is lusterless; sculptured with less oblique and sinuous thread-like riblets separated by less wide intervals. Whorls 10–41 a little convex, the last free in a shorter neck, with the aperture more oblique. Axis twisted and encircled by an inconspicuous spiral thread, minutely spinose above.

Long. 12, diam. 2.1, ap. diam. 2 mm., whorls 12.

Central Cuba: On stones along the road east of El Bano de Mayajigua in the Province of Santa Clara.

This may be regarded as a degenerate form of *U. bacillaris* living in the plain near the foot of the mountains where the typical form lives.

U. (*Gongylostoma*) *stricta* n. sp. Plate vi, figs. 16, 17.

Differs from *U. bacillaris* in its more slender shell which in this species is not swollen and is almost cylindric in the middle third; also differs by the sinuous, well-raised riblets, more regularly wide-spaced throughout which are somewhat tubercular at their upper ends. Whorls slightly convex. Axis encircled by a thread-like spinose lamella which in some of the whorls has an indistinct spiral cord above it.

Long. 19, diam. 2.2, ap. diag. 2, whorls $16\frac{1}{2}$.

Long. 13.7, diag. 2, whorls $12\frac{1}{2}$.

Central Cuba: On stones at Lomas del Purio near Calabazar de Sagua in the Province of Santa Clara.

This species resembles *U. wrighti* Pfr. though it is less slender and more strongly sculptured.

Urocoptis (*Gongylostoma*) *boqueronis*, n. sp. Plate vi, figs, 1, 2, 3.

Slenderly fusiform, tapering to a narrow truncation above; thin, corneous with some indistinct darker streaks; regularly sculptured with narrow thread-like whitish riblets which are slightly arcuate, somewhat oblique in the upper half, less so in the lower, and separated by intervals two or three times their width. Whorls 11–13, a little convex, the last free and produced into a rather short neck. Aperture subcircular, a little oblique, the peristome whitish, expanded and somewhat reflexed. Axis encircled by one spiral spinose lamella with a low spiral cord above it.

Longitude 13.2, diameter 2.4, aperture diameter 2, whorls 13½.

Central Cuba: On walls exposed to the sun at the entrance to El Boqueron, an underground passage of the river Tatibonico del Norte through the Sierra de Tatibonico, in the eastern limit of the Santa Clara Province.

This species differs from *U. bacillaris* and its varieties by its non-sinuous but slightly arcuate riblets, more uniform color, less produced neck, etc.

Urocoptis (*Gongylostoma*) *parallela*, n. sp. Plate vi, figs. 4, 5.

Slenderly fusiform, frequently entire, somewhat swollen in the middle, tapering to a narrow truncation or to the bulbous apex: pale brown in color; sculptured with strong wide-spaced riblets which are nearly straight; whorls 26–28 (entire), 12–14 in the truncate specimens, somewhat convex, the last one free and produced in a long curved neck. Aperture subcircular, slightly or not at all oblique, peristome whitish, expanded and reflexed as in the other related species. Axis encircled by one spiral spinose lamella and a well developed spiral cord above it.

Longitude 20, diameter 2.9, aperture diameter 2.5, whorls 26, (entire).

Longitude 15.2, diameter 2.9, aperture diameter 2.6, whorls 13½, (truncated).

Central Cuba: On walls exposed to the sun at the north side of

El Boqueron where reappears from underground the river Tatibonico de Norte, in the eastern limits of the Santa Clara Province.

This species resembles *U. boqueronis* but is easily distinguished from it by the larger size, uniform color, the straighter riblets which are also stronger and wider spaced.

Urocoptis acicularis, n. sp. Plate vi, fig. 6.

Cylindric-subulate, very slender, the upper third tapering to a very narrow truncation or to a bulbous apex; brownish with scattered dark corneous streaks bordered with white patches. Sculpture, delicate thread-like and wide-spaced riblets which are nearly straight and slightly or not at all oblique. Whorls 25–28 in the entire shell, 14–16 in the truncate specimens, nearly flat, the last free in a curved neck with a weak basal keel. Aperture subcircular, brownish inside, the peristome white, glossy, expanded and flatly reflexed. Axis encircled by one spiral, denticulate or spinose, well-developed lamella without a noticeable cord above it.

Longitude 17, diameter 2, aperture diameter 2, whorls 27, (entire).

Longitude 14, diameter 2.1, whorls $15\frac{1}{2}$, (entire).

Longitude 15.2, diameter 2.3, whorls $15\frac{1}{2}$, (entire).

Central Cuba: On stones and walls at Chinchilla and the Mogotes de las Tumaguas, near Sagua la Grande in the Province of Santa Clara.

Characterized and distinguished from the others of the group chiefly by its cylindric form and very slender shell.

Urocoptis (*Gongylostoma*) *camagueyana* n. sp. Pl. vi, figs. 12, 13.

Fusiform-cylindric, more swollen above the middle and slowly tapering to a wide truncation; cream-colored or pale corneous, a little darker below. Sculptured with very strong cord-like whitish riblets which are in part hollow but rarely broken, more inflated and closely spaced in the upper than in the lower whorls, where they become degenerate, though again becoming somewhat lamellose on the neck. The suture is denticulate by the projection of the ends of the riblets. Whorls 7–9, somewhat convex, the last one free and produced in a long, round, twisted neck. Aperture subcircular, slightly oblique, the peristome whitish, expanded and a little re-

flexed. Axis encircled by an inconspicuous spiral cord which is somewhat lamellose and minutely spinose above.

Long. 11.3, diam. 2.5, ap. diam. 2, whorls 8.

Long. 14.5, diam. 2.8, whorls 13.

Central Cuba: On stones at El Cercado, Cerro de Tuabaguey, and Los Paredones, a narrow pass across the Sierra de Cubitas, in the northern part of the Province of Camaguey.

This little species, notable for its wide truncation, strong cord-like riblets and the long contorted neck, belongs to the same group as the more elongated preceding species of the neighboring region of Santa Clara province, but it is also geographically and morphologically one of the most distant forms of this section. Notwithstanding, in the young specimens, when the shell is complete, it has the shape of *U. boqueronis* and *U. parallela*, its singular form being due to the mutilation suffered in the adult stage; the aperture and peristome are similar; the internal axis, though different at first sight, because it is encircled by a low cord, if attentively examined in the first whorls, appears to be somewhat lamellose, and bearing very minute characteristic spines at the edge; and finally the radula is of the same type as in *U. bacillaris*, etc., similar to that of *U. baculum* Pilsbry, and to Pilsbry's section *Tetentrodon:* 15 to 19 teeth; but in *U. camagueyana* the two last lateral teeth are so degenerated that only their places remain on the radula, so that the formula could be (2)5.2.1.2.5(2).

NOTES.

Pleistocene Fossils from Eastern Cuba.—Mr. Clarence L. Aman at my request investigated a deposit of clay exposed in an excavation at Guamo, on the Rio Cauto, Oriente Province, Cuba. He sent the following species to the Academy of National Sciences: *Marginella minuta* Pfr., *Bittium gibberulum* Ad., *Cæcum* (*Meioceras*) *nitidum* Stimp., *Leda acuta* Conr., *Polymita picta* Born, *Cepolis strobilus* Fér., *Cepolis lucipeta* Poey and *Pleurodonte emarginata* Gdl. This find is interesting as it shows that in Pleistocene times the sea extended far up the Cauto valley.—E. G. Vanatta.

Ashmunella thomsoniana.—I recently collected a dead shell of this species in a new locality, the steeper part of the trail between

the Field and Viveash ranches in the cañon of the Pecos River, New Mexico. The specimen is to be referred to *thomsoniana* proper, having the basal tooth simple, but it is the smallest on record for that species; diam. max. $11\frac{1}{3}$, min. a scant 10, alt. $6\frac{1}{3}$; whorls $4\frac{1}{3}$. Should this small size and number of whorls prove constant in the locality, the snail would I think deserve to be separated as a race.—T. D. A. Cockerell.

The Genera Cryptogirasia and Cryptosoma. In the Fauna of British India, Mollusca (vol. I, 1908), p. 203, Godwin-Austen adopts the generic name *Cryptogirasia*, crediting it to "Cockerell, A. M. N. H. (6) vii, 1891, p. 99 (no description)." The name *Cryptogirasia* was a manuscript one of mine, dating from 1891; but as a matter of fact it was printed in the plural form (*Cryptogirasiæ*) in the place cited. It was not wholly without description; this and the other genera and groups of "*Helicarionina*, sens. lat." were defined by a table. From the standpoint of generic nomenclature, *Cryptogirasia* must date from 1908, when it was adopted and defined by Godwin-Austen. The other genera credited to me in the same work were published in the correct form, either in P. Z. S. or Nautilus. They were defined in the table cited. *Cryptosoma* Theobald, 1857, applied to an oriental genus of the same family, is a homonym of the earlier *Cryptosoma* Brullé, used for a genus of crabs of the family Calappidæ. I have not found the exact date of Brullé's genus, but it is not later than 1848. The Molluscan *Cryptosoma* may take the name *Megaustenia*; type *Megaustenia præstans* (*Vitrina præstans* Gould, 1843).

T. A. Cockerell.

Unio (Nodularia) Putzeysi new name for *U.* (*Nodularia*) *subnigra* Preston.—Mr. Bryant Walker having pointed out to me that the name "*subnigra*" used by me (Ann. Mag. Nat. Hist., London, Ser. 9, vol. IV, 1909, p. 89) for a species of *Unio* from the Lower Belgian Congo is preoccupied, I now propose to substitute for this the name "*Putzeysi*" in honour of Dr. S. Putzeys of Brussels, whose work on the land and fresh-water molluscan fauna of the Belgian Congo is well known to every student of the conchology of that region.—H. B. Preston.

PUBLICATIONS RECEIVED.

THE MALACOLOGICAL SOCIETY OF LONDON has given variety to the last number of the *Proceedings* by adding a department of humorous fiction. In it they print a fantastic farce entitled "A synopsis of the recent and tertiary fresh-water mollusca of the Californian Province." A leading part in this piece is taken by a weird character called "Syntonia," or the "Syntonic Form"—a sort of djinn or genie, competent to produce any transformation desired with the aid of a pinch of magnesium salts, which the author obligingly supplies when it cannot be found otherwise.

That magnesium salts are "producing the mischief" with the snails is proved by an act with "balanced aquaria,"—conditions, results and laboratory where done not specified.

What the Syntonic Form cannot do is readily accomplished by an "accentuation of the evolutionary influences" which, along with other deviltry, are to blame for making *Lymnæa auricularia* out of the "so-called *peregra* and *catascopium*." Curious nobody ever thought of this perfectly lucid explanation before.

But what occult influence is responsible for subgenera based on forms ranked as subspecies of species belonging to other subgenera? Or putting a genus in one subfamily, its subgenera in another (done several times on p. 147)? The method of classification is blamed on Professor Hyatt, but we all know that Hyatt was a good naturalist. He was above all a believer in strictly phylogenetic classification. He had little use for such elementary trifling in taxonomy as grouping together genera of different phyla which have reached superficially similar or analogous evolutionary stages.

Time wasted in looking up type specimens might be saved if naturalists would get syntonic brains by judicious dosing with magnesium salts. Just see what has been done to the freshwater Mollusca of the Californian Province! Synonymy can be made by glancing over a few books; classification by drawing the names out of a hat after they have been well shaken up. The study of variation and inheritance may be be left to old fogies who want to know what really happens under known conditions.

We fear that the Malacological Society has started out too well in its department of humorous conchology. Merely ignorant or wrong-headed articles they may possible get, but where such another contribution to the gayety of nations as this?—H. A. P.

The Mollusca of Colorado, Part III. By Junius Henderson (Univ. of Colo. Studies, vol. IX, May, 1912). Contains numerous additional locality records (of which fourteen pertain to species and subspecies not included in former parts of the work), some rectifications, and evidence for the removal of a few species given in former lists. A faunal work is never finished, but the papers by Mr. Henderson form a good foundation for further work in Colorado. It is by far the most complete account of any Rocky Mountain mollusk fauna.

The West American Mollusks of the genus Eumeta.

The recent and fossil mollusks of the genus Cerithiopsis from the west coast of America.

The recent and fossil mollusks of the genus Bittium of the west coast of America.

New mollusks of the genus Aclis from the North Atlantic.

The west American mollusks of the genus Amphithalamus.

The recent and fossil mollusks of the genus Alvania from the west coast of America.

The west American mollusks of the genus Cingula.

These papers by Dr. Paul Bartsch published in the Proceedings of the National Museum for 1911–12 are well-illustrated monographs of the west American species of the genera named. All are small or minute shells, the identification of which has hitherto been of great difficulty owing to the brevity of the scattered literature concerning them, and the lack of illustrations. Dr. Bartsch has described the old and new species with a fulness of detail which all who work with these forms hereafter will appreciate.—H. A. P.

Report on Landshells collected in Peru in 1911 by the Yale Expedition under Professor Hiram Bingham. By William Healey Dall (Smithsonian Misc. Coll. vol. 59, No. 14, 1912). Extensions of the known range of a considerable number of species are given, but the chief interest of the paper attaches to the discovery that a group of slender Andean Bulimuli including *scalaricosta*, *infundibulum*, *umbilicatellus*, *tubulosus* and *spiculatus* have an internal lamella on the axis, somewhat as in *Holospira*. The new subgenus *Phenacotaxus* (type *umbilicatellus* Pils.) and the section *Ataxiellus* (type *pectinatus* Dall) are proposed to receive these forms. The color-variation of *Drymæus poecilus* Orb. is discussed.—H. A. P.

D. D. BALDWIN.

The Nautilus.

Vol. XXVI. NOVEMBER, 1912. No. 7

NOTES ON MAINE MOLLUSCA.

BY REV. HENRY W. WINKLEY.

For the purpose of making a more careful examination of the warm-water colonies in Maine, the writer spent two weeks at Wiscasset and the same time at Orr's Island in Casco Bay. General collecting at Wiscasset revealed the same species that I found on former visits. A careful search in sheltered places revealed several colonies of *Odostomia trifida* and *bisuturalis*, especially large and abundant at Edgecomb. A drive of five miles and work in a drenching rain at Sheepscote Bridge gave one or two specimens of *Odostomia bisuturalis* var. *ovilensis*, *Modiolus demissus* var. *plicatulus* and *Ostrea virginiana*. Unfortunately the refuse from a saw-mill has nearly exterminated life at the type locality for *ovilensis*. Ten miles east of Wiscasset, at Newcastle and Damariscatta, I had only one low tide, but I found *Modiolus demissus* var. *plicatulus*, *Crepidula convexa*, *Ilyanassa obsoleta*, *Haminea solitaria*, *Urosalpinx cinereus*, *Astyris lunata* and *P.* (*Syrnola*) *fusca*, the last two new to Maine, I believe. *Odostomias* have been found here by Mr. Wentworth, but I didn't have time to visit the locality where he found them.

At Orr's Island I found two more colonies of *Astyris lunata*, a few *Odostomia bisuturalis;* other forms of interest were *Cingula aculeus*, *Skenea planorbis* of a light color, *Retusa pertenuis* and *gouldii*, *Bela bicarinata* var. *violacea* (one specimen at low tide) and *Mysella planulata*, with of course the more common forms. I found only one land shell, *Zonitoides arborea*.

A day was spent in the famous Quohog Bay. I dredged the whole length of the bay and found it absolutely barren, except a very interesting colony at the head of the bay. The species found there were : *Ensis directus*, *Callocardia morrhuana*, *Macoma calcaria*, *M. balthica*, *Yoldia limatula* (the largest I have ever seen), *Venus mercenaria*, *Mysella planulata*, *Gemma gemma*, *Tellina tenera*, *Retusa pertenuis*, *Crepidula convexa*, *Haminea solitaria*, *Astyris lunata*, *Odostomia trifida*, *bisuturalis*, *winkleyi* and *gibbosa*.

A trip to the biological laboratory at South Harpswell enabled me to rob the cemetery in the next lot, result equal: *Vitrina limpida*, *Cochlicopa lubrica*, *Pupilla muscorum*, *Vallonia excentrica* and *Pyramidella cronkhitei* var. *anthonyi*.

The famous Brown Cow Island was visited. *Helix hortensis* banded and plain was there, but not so abundant as sixteen years ago. I also obtained a few of the beautiful wine-colored *Polygyra albolabris*, together with *Succinea ovalis*, *Pyramidula alternata*, *Vitrea hammonis*, *Vitrina limpida*, *Pyramidula cronkhitei anthonyi*, *Helicodiscus parallelus* and *Cochlicopa lubrica*.

On the whole a very satisfactory summer, with several species added to the marine list.

ON A COLLECTION OF MARINE GASTROPODA FROM ADEN WITH DESCRIPTIONS OF NEW FORMS.

BY MAXWELL SMITH.

(Read before the Brooklyn Conchological Club Jan. 29, 1912).

The collection which forms the subject of this paper is a portion of a series collected by Mrs. Blair, the wife of a Governor of Aden. The greater portion of this interesting collection is housed in the Royal Scottish Museum of Edinburgh. During the summer of 1910 Mr. Eagle Clarke, the Curator of the Department of Mollusca, placed in my hands a number of shells selected from the Blair collection. Upon reaching London I compared many of the species with the types in the British Museum and also examined the collections made by Messrs Yerbury and Baynham which are preserved in the same institution.

A brief résumé of the work that has already been done at Aden

may be of interest. One of the most exhaustive treatises dealing with molluscan life in these waters may be found in the proceedings of the Zoological Society of London, 1891, part iii. In this paper Mr. E. A. Smith lists the collections made at Aden by Major Yerbury and the Rev. Mr. Baynham. Mr. Smith also gives a review of the principal collections previously recorded from Aden. Signor Caramagna, Dr. Jousseaume and the Rev. A. H. Cooke reported on mollusks from the vicinity of Aden. After the appearance of Mr. Smith's paper Commander E. R. Shopland was apparently the next person who collected extensively at Aden. His field work was accomplished between 1892 and 1901. An account of the results may be found in the Proceedings of the Malacological Society of London (Vol. 5 page 171).

My best thanks are due Mr. Eagle Clarke of Edinburgh and Mr. E. A. Smith of London for their kindness in supplying data, without which it would have been impossible to prepare this paper.

Sepia rouxii D'Orb. According to Tryon this cephalopod inhabits the Red Sea and Indian Ocean. It is thus natural to find it in the Gulf of Aden, which connects the two.

Conus amadis Auct.

Conus betulinus L.

Conus cuvieri Crosse. As Mr. E. A. Smith writes, this species is not identical with *C. cervus*. In my opinion *cuvieri* is a distinct species.

Conus nussatella L.

Conus taeniatus Hwass.

Conus textile L.

Terebra cærulescens Lk.

Terebra cinerea Born.

Terebra clarkei n. sp. Plate IV, fig. 18.

Shell slender, shining, suffused irregularly with golden brown; whorls 9–10, somewhat gradually increasing, distinctly rounded; apex acute, darker in color; surface closely plicated, forming on the earlier whorls slightly crenulated sutures, plications extending to the base; distinctly three banded, the two lower bands closer together; aperture long.

This species comes in the same section of the genus as *T. nitida* Hinds. From *Terebra celidonota* Melvill & Sykes it differs in being more slender. The aperture is also longer and there are three spiral

bands in place of the one band, near the suture, which occurs in *celidonota*. In *clarkei* only one of the bands is visible on the upper whorls. I take pleasure in naming this species after Mr. Eagle Clarke. Type in the writer's collection.

Terebra lamarckii Kien. I agree with Mr. Smith upon the validity of this species. The examples before me are well defined and show little variation. Tryon and Reeve considered it a variety of *T. duplicata* L. In the latter the longitudinal striæ are farther apart. The style of coloration is also strikingly peculiar.

Pleurotoma tigrina Lk.

Murex palma-rosæ Lk. Not previously reported from Aden.

Murex ramosus L.

Murex rota Sowb. Fresh beach specimens were obtained of this beautiful species.

Murex tenuispina Lk. This and *M. palm-rosæ* may have been obtained at some distance from Aden.

Columbella picta Reeve. Pl. IV. fig. 13. Up to the present the locality of this species has been unknown. The specimen before me agrees perfectly with the type in the British Museum.

Columbella misera Sowb. var. *californica* Reeve. Plate IV, fig. 15. Dr. Pilsbry, to whom I submitted the single example, writes "this occurs in Japan—not in California, which was an error of Reeve's."

Columbella propinqua E. A. Smith. Plate IV, fig. 14. The type is in the British Museum.

Columbella terpsichore Leathes. Plate IV, fig. 12. Aden, as the first locality known for this species, was reported by Shopland. The type is in the British Museum.

Eburna valentiana Swainson. I am inclined to believe that this is only a stout form of *E. spirata* as pointed out by Von Martens.

Nassa albescens Dunker.

Nassa arcularia L.

Nassa bimaculosa A. Ad. From other examples in my collection I conjecture that *bimaculosa* is a valid species.

Nassa canaliculata Lam.

Nassa coronata Lam.

Nassa fissilabris A. Ad.

Nassa gemmulata Lam.

Nassa nodifera Powis.

Nassa pulla L.

Nassa pulla L., var. *minor*, n. var. Plate IV, fig. 17. The length of this shell is about the same as the aperture of the type. All the examples obtained are of the same size.

Vasum cornigerum Lam.

Ricinula ricinus L.

Rapana bulbosa Solander.

Cancellaria melanostoma Sowb.

Mitra costellaris Lam. Apparently the first record of the species in these waters. Shopland reports 50 species of *Mitra* as occurring at Aden. With the addition of two species taken by Yerbury and Baynham, and the present two species, the total number is brought up to 54.

Mitra crenulata Lam.

Mitra deshayesii Reeve. This species may be said to inhabit the triangle formed at the corners by Polynesia, Mauritius and the Red Sea. It has not before been reported from the Gulf of Aden.

Mitra plicata Lam.

Latirus polygonus Gmelin.

Harpa minor Rumph.

Harpa ventricosa Lam.

Oliva andamanensis Bdg. Plate IV, fig. 7. The four examples before me agree perfectly with those in the British Museum, which were taken at the Andamen Islands.

Oliva inflata Lam. From the number of individuals taken, this must be an abundant form.

Ancillaria acuminata Sowb.

Ancillaria albisulcata Sowb. A characteristic feature of this species is the long white columella.

Ancillaria castanea Sowb. I am inclined to believe that this species will prove to be a variety of *A. fulva*. The color is the only distinction.

Ancillaria fulva Swains. The columella of this species is considerably thickened at the base.

Marginella obscura Reeve. Plate IV, fig. 16. The locality of this species was for many years unknown. In 1891 Mr. E. A. Smith discovered the species among the Yerbury and Baynham Collections and included it in his list (P. Z. S. L.). When in London I examined these shells and also the type. The Blair shells are slightly larger, but otherwise similar to the type.

Cassis nodulosa Gmelin. The example before me is remarkably fine. There are 12 tubercles on the margin.

Lotorium pilearis L.

Natica lineata Lam.

Natica chinensis Lam.

Naticina papilla Gmel.

Cypræa clandestina L.

Cypræa cruenta coloba Melvill.

Cypræa erosa nebrites Melvill. Plate IV, fig. 9.

Cypræa erosa subalba, n. var. Plate IV, fig. 11.

This beautiful new variety of *erosa* comes nearest to *nebrites*. It differs from the latter in possessing milk white "specks" on a violet white ground. The ocellations are not so persistent as in the var. nebrites. The brown square spots, however, are similar. Type in the writer's collection.

Cypræa erosa carmen n. var. Pl. IV, fig. 10. Sides much swollen, pitted and furrowed above the callus on the left side. The base is white, having none of the stippling of *nebrites*, and the squarish spot at the side is nearly or quite covered by the basal callus. The back is pale lilac-pink with traces of white spotting at the sides only. Two cotypes measure 32 and 24 mm. long, in coll. A. N. S. P. (No. 106457) and my own.

Cypræa errones L.

Cypræa felina ursellus Gmel. This variety may easily be distinguished by the white base.

Cypræa helvola L. Pl. IV, fig. 8.

Cypræa helvola L. var. mascarena Melvill. Plate IV, fig. 6.

Cypræa isabella, L.

Cypræa pantherina Sol. Among the series are the vars. *theriaca* (one nearly black), *albonitens* and *syringa*.

Cypræa staphylæa L. This species has apprently not been reported from Aden.

Cypræa stolida L. This new record extends the western range beyond Ceylon.

Cypræa talpa L.

Cypræa tigris L. One individual is 4½ inches long.

Cypræa turdus Lk. The Aden shells are large. I have in my collection three similar specimens which where taken at Muscat, Arabia. This species reaches its greatest development in the Per-

sian Gulf, where the shells are of the same size but greater in weight. The dorsal surface of the Persian Gulf examples I find white and the coloring also somewhat lighter.

Turritella columnaris Kien.

Mitrularia equestris L. var. *tortillis* Reeve.

Strombus columba Lam. Tryon when writing the Manual was uncertain as to the presence of this species in the Red Sea. Shopland's report and the present record confirm the presence of the species in these waters.

Strombus gibberulus L.

Strombus mauritianus Lam. Tryon and Paetal cite Mauritius as the home of this Strombus. I doubt if it was collected so far north.

Strombus variabilis Swains.

Rostellaria curvirostra Lam. A young specimen is of interest. There are 14 whorls present. The embryonic whorl is pearly, the following $10\frac{1}{2}$ whorls covered with the longitudinal plications, the remaining whorls smooth except the lower portion of the body whorl which is ornamented with spiral lines. The opercula of an adult is twisted and the under surface raised in the center.

Bullaria ampulla L.

Hydatina physis L.

Umbraculum indicum Lam.

NOTE ON A VARIETY OF POLYGYRA FALLAX.

BY H. A. PILSBRY.

The group *Triodopsis* in States of the Atlantic slope presents numerous forms which by their variations perplex the conchologist. *Polygyra* (*Triodopsis*) *hopetonensis* (Shuttlw.) in its various varieties is a widely-spread species. The variety *obsoleta* from Newbern, N. C., probably belongs to it, but it needs further investigation with more specimens.

Polygyra vannostrandi (Bld.) is distinct by its closely coiled whorls, but the aperture is like that of *P. fallax*, both having large teeth, the basal tooth inclined to be double and the outer lip-tooth wide and deep-seated. The two species are not always easy to tell

apart, but are doubtless distinct. *P. v. alabamensis* and another variety, with decidedly wider umbilicus, but still unnamed, replace typical *vannostrandi* in Alabama. Neither is so distinct as to be startling.

Polygyra fallax is common in southeastern Pennsylvania, and extends south to the Carolinas at least. Specimens taken by Messrs. Henderson, Walker, Clapp and myself at Smith's Island, Cape Fear, are much smaller than Pennsylvanian shells. In the western part of the Ozark region the closely related and still smaller *P. cragini* (Call) occurs, being widely separated from all parts of the range of *P. fallax*.

When collecting fossils in Florida in 1900, Mr. C. W. Johnson found a peculiar variety which seems referable to *fallax*, and which I think is worthy of a name.

Polygyra fallax goniosoma n. subsp. The shell differs from *P. fallax* by being distinctly or strongly angular in front, the angle being situated high on the whorl. Sculpture of rib-striæ stronger above the angle, the striæ becoming smaller below it, and usually more numerous by intercalation of striæ. Aperture as in *fallax*, the outer lip retreating, outer lip-tooth broad and deeply placed, basal tooth buttressed on the columella side, parietal tooth angularly bent.

Alt. 7, diam. 12.4 mm.; whorls $5\frac{1}{2}$.

Alt. 6.2, diam. 10.3 mm.; whorls $5\frac{1}{3}$.

Blountstown, Calhoun Co., Florida, under oak logs in oak and pine woods, collected by C. W. Johnson, 1900. Cotypes no. 77948 A. N. S. P.

This form may possibly be referable to *P. vannostrandi*, but in the number of whorls it agrees better with *P. fallax*.

MOLLUSCA FROM NORTHERN NEW MEXICO.

BY JUNIUS HENDERSON.

In 1910, while engaged in ethno-zoological work for the School of American Archæology, at its summer camp in the canyon of El Rito de los Frijoles, about thirty-five miles northwest of Santa Fe, New Mexico, and also in the near-by Jemez Mountains, near Valle Grande, I collected the following species of mollusks:

Ashmunella ashmuni Dall. Abundant at Rito. A few immature specimens from the mountain locality may possibly be the variety *robusta* Pils. The Rito is not a great distance from Bland, the type locality of *ashmuni*, and *robusta* was described as from "Jemez Mountains near Bland, New Mexico, at higher elevations than *ashmuni*."

Oreohelix strigosa depressa Ckll. Three dead specimens at the mountain locality.

Pupilla muscorum L. One at the Rito.

Pupilla blandi Morse. Abundant at both the Rito and the mountain locality.

Bifidaria pellucida parvidens Sterki. One at the mountain locality. Identified by Prof. Cockerell.

(*Vertigo coloradensis basidens* P. & V. Though the type locality is Bland, N. M., none were found at the Rito.)

Cochlicopa lubrica Müller. Common at the Rito.

Vallonia cyclophorella Ancey. Abundant at the Rito and common at the mountain locality.

Vitrina alaskana Dall. Three dead ones at the mountain locality and four at the Rito.

Euconulus trochiformis alaskensis Pils. Common at the Rito and one at the mountain locality.

Zonitoides arborea Say. Abundant at the Rito and common at the mountain locality.

Pyramidula shimekii cockerelli Pils. Only two at the summer camp at the Rito, but abundant two miles above.

Succinea avara Say. One at the Rito.

With the exception of *Ashmunella* and *Bifidaria*, it will be noticed that this is the fauna common in the mountainous portions of Colorado, in similar situations. It would be interesting to know how far north *Ashmunella* extends, which could be determined by an examination of the Rio Grande Valley and adjacent mountains from Buckman northward into Colorado.

University of Colorado, Boulder, Colo.

DAVID DWIGHT BALDWIN.

D. D. Baldwin, the veteran Hawaiian conchologist, died at Honolulu, June 16th, at the age of eighty years and seven months. Burial was in the old Makawao Cemetery, Maui.

Mr. Baldwin was born at Honolulu November 26, 1831. His childhood was spent at Waimea, Hawaii, and his boyhood at Lahaina, Maui. From 1844 till 1851 he attended the Punahou School, where he was prepared for college under the tuition of the Rev. Daniel Dole. In 1852 he sailed for the United States by way of Cape Horn. He entered Yale College in 1853, and graduated there with honor in 1857, taking the astronomical prize. During his college course he became acquainted with Miss Lois Gregory Morris, whom he married October 7, 1857. Returning to the Islands he became principal of the Lahaina School, which he conducted for seven years. Latterly he engaged in the cultivation of sugar cane. From 1865 to 1872 he was manager of the Kohala Planatation, where he introduced the so-called Lahaina cane, to which that plantation owed its success. He then visited New Haven, Conn., where he remained over a year. On his return, in 1874, he was appointed vice-principal of Lahainaluna Seminary.

In 1877 Mr. Baldwin was appointed Inspector-General of Schools, holding that post for eight years. During his administration, and largely by his influence, the number of schools in which the English language was the basis of instruction increased from five to one hundred. He also drew up the first course of study for such schools.

In October, 1885, he retired from the arduous position of Inspector-General to take his former position as vice-principal of Lahainaluna Seminary. In 1891 he removed to Haiku, Maui, and finally retired from educational work in January, 1905, having been connected with the Department of Public Instruction for thirty-eight years.

While Mr. Baldwin's energies were largely devoted to education, he was deeply interested in the natural sciences, especially studying shells, ferns and mosses. In conchology he was esteemed the chief Hawaiian student, and almost the only one to publish original work on *Achatinellidæ* between the period of Newcomb and Gulick and the present time. Baldwin's Catalogue of Land and Fresh-water Shells of the Hawaiian Islands (Honolulu, 1893), though brief and

unpretentious in form, has been most useful to other investigators for its judicious and reliable synonymy and its locality records, the fruit of extensive collecting and inquiry.

Many beautiful new species of *Achatinellidæ* were described by Baldwin in articles published in the Proceedings of the Academy of Natural Sciences of Philadelphia (1895) and in THE NAUTILUS. Among them are several of exceptional interest to those tracing the relationships of the species and genera.

Mr. Baldwin was known extensively among conchologists in America and abroad as a kind and generous correspondent. He supplied many of the new Hawaiian species described by Ancey, Sykes, Pilsbry and others.

His extensive collection and scientific library remain the property of his son Mr. E. D. Baldwin, of Honolulu.

Species of the genera *Amastra*, *Leptachatina*, *Tornatellina*, *Philonesia*, *Endodonta*, *Cecilioides*, *Succinea*, *Helicina* and *Melania* have been named in honor of Mr. Baldwin, and Ancey dedicated to him the group *Baldwinia*, a section of *Partulina*. These, with his good work on *Achatinellidæ*, will keep his memory green.

GEORGE W. TAYLOR, D. D.

The Rev. Dr. George W. Taylor died at his home on Departure Bay, Vancouver Island, August —, ——. Dr. Taylor was well known as a student of Pacific coast shells, especially those of British Columbia. A keen collector in conchology and entomology, he was also well posted in many other branches of natural history.

When a biological marine station was established on this coast, he was put in charge by the Dominion government, remaining in that position until his death. He was largely responsible for the establishment of this station, chose the site on Departure Bay, near Nanaimo, Vancouver Island, and had the building of the station left entirely in his hands.

Dr. Taylor leaves a very large and valuable collection of shells, particularly rich in *Limpets* and *Unionidæ*. In the Transactions of the Royal Society of Canada, 1895–96, he published a Preliminary Catalogue of the Marine Mollusca of the Pacific Coast of Canada, with notes upon their distribution; also a Supplement to the same a

year or two later. He was engaged upon a new Catalogue for publication when I visited him two years ago, which owing to poor health was never completed. Dr. Taylor was a Fellow of the Zoological Society and a Fellow of the Royal Society of Canada. He also published lists of the land and fresh-water shells of Vancouver Island and of British Columbia.—A. W. Hanham.

NOTES.

Land Shells of Carthagena, Colombia.—During a brief stop at this port Dr. A. P. Brown collected the following snails on the hill La Popa, about a mile from Carthagena: *Euglandina cumingi* (Beck), *Oxystyla maracaibensis* (Pfr.) and *Bulimulus krebsianus* Pils. The hill is chiefly composed of recent corals and sea shells. H. A. P.

Viviparus contectoides in Philadelphia.—Mr. J. Baily, Jr., discovered *V. contectoides* Binn. in a lily pond near Memorial Hall, Fairmount Park, Philadelphia, in June, 1909; Mr. S. Jacobs collected some at the same place in 1910, and Mr. H. L. Mather found it again on April 20, 1912, showing that the species is well established there. E. G. Vanatta.

Lymnaea (Radix) auricularia Linn. in Colorado.—Mr. F. R. Warren, the well-known mammalogist, has transmitted to me for examination five specimens of this species, which were collected alive in a pond on Monument Creek, in Colorado Springs, Colorado, by C. F. Fraker. I wrote to Dr. F. C. Schneider, of Colorado College, which is located in that city, and asked him to look for more. He replied: "We went to the pond in Monument Park for them, only to find it recently cleaned. As a result we took only one specimen." There is no reason to doubt that the species has been accidentally introduced there, and it will be interesting to note how it withstands the climatic conditions of Colorado, at an altitude of nearly 6,000 feet.

Junius Henderson,
University of Colorado, Boulder, Colo.

THE NAUTILUS.

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CONCHOLOGICAL CHAT FROM LONDON.

BY CHARLES HEDLEY.

Like so many kindred institutions the Natural History Museum at South Kensington has suffered from its architect. Space and funds have been lavished on fantastic decoration which would have gone far to improve laboratory accommodation. Our subject has suffered with others, perhaps more than others, from cramped space and poor illumination.

The hall devoted to conchology is about a hundred and forty feet long and forty broad, and is lit by windows in the roof. From the ceiling hangs two huge American models of Cephalopoda with outstretched tentacles. These fearsome things are the principal attraction for the casual visitor.

Around the walls special series are displayed. The wants of the local students are satisfied by an excellent exhibition of British Mollusca; the slugs and minute shells being shown by drawings.

General morphology is admirably illustrated by models, figures and specimens, both whole, sectioned and dissected. The operculum for instance is traced through various modifications. Branchiae and other organs are shown in large models. There are micro-photographs of lingual ribbons. A movable frame imitates the torsion of the prosobranchiate viscera. Monstrosities have a case to themselves. Application of shells to arts and industries, to wit, ostreaculture, cameo cutting and the pearling industry are appropriately

displayed. Parts of perforated hulls or piles exemplify the damage inflicted on the works of man by the shipworm.

In this high latitude and damp climate the colors fade but little. Protection in this respect is afforded by drawing the window blinds on a bright day.

The floor of the hall is occupied by about two hundred glass-topped double-deck cases standing waist-high above chests of locked drawers. These run in four rows down the room and are divided by broad gangways.

A modern policy in museum administration is to divide collections into a general exhibit and a special study series. The former presents an epitome of the subject for the use of the public or the beginner in science, the latter to contain types and full series for the study of the specialist. Such special collections are kept in rooms from which the public is excluded, where books, microscopes and the like are available and where drawing or dissecting can be done. This arrangement is current in other departments at South Kensington but not in that of conchology.

Practically the whole of the museum collection of shells is exhibited or stored in the public hall. Shown in the glass cases to the general public are named examples of almost all the shells of the world.

When a specialist consults the collection, an attendant unlocks the drawers or cases indicated and waits beside the student till the case is to be locked up again. To the public an open case and a conchologist at work are part of the show. So he is tormented and distracted by rustics who try to read what he is writing in a note-book, by children who want to finger the priceless types he is examining, or by beginners who want his help in naming shells. If the public were excluded it still would be sufficiently difficult to make observations and comparisons with a pocket lens in a dim-lit hall and write with a fountain pen upon the cases for a table.

Recent acquisitions to the collection are mounted in black, square, glass-topped boxes, and labeled both under the lid and on the bottom of the box. The bulk of the collection is, however, gummed on paper-covered wooden tablets. Labeling consists of the separate specific name and author, written or printed on white paper in the lower center, the locality in the left lower corner. Where "type" occurs it is at the left top corner. The generic name in larger print

occupies a separate tablet. On the under surface of the tablet, H. C. in the corner, means that it was a part of the famous Hugh Cuming collection. Besides, the under surface sometimes has a wealth of scientific information; critical notes by those who have worked upon the collection. Here the specialists gather a harvest of synonomy, references to literature, comparisons, collected notes on habitat, and so forth. The register number, including the year of accession, when it occurs, is given here. But the student may glance over the face of the collection and miss the information jotted down by his predecessors, but concealed below. Frequent reversal of the tablets helps to dislodge the specimens. Types are not invariably thus distinguished. I noticed several "Challenger" shells, which though evidently types, were not so marked. There is more strictness in this respect of late years than of former.

After a lapse of time the gum becomes brittle, so that the opening and shutting of a drawer or the lifting of a tablet may unfasten a shell. The loose shell may readily be returned to a wrong tablet and thus originate error. For this reason it is to be hoped that the whole collection will be ultimately transferred to boxes. Again in boxes they are easier to examine, far safer from dust and from accidental crushing.

In former years no clear distinction prevailed between the range in space of a species and the source of a particular specimen. So "localities" were "added" rather recklessly and perhaps sometimes erroneously to old specimens not provided with a "habitat." Even upon the original tablet of a type subsequent specimens have sometimes been intruded. Again in the union of names, a species was apt to be submerged under the name of another species with which it was thought identical. Varietal names were disallowed, so that an absolute synonym and a geographical race were treated alike in elimination.

On the whole, the nomenclature is well up to date. Recent suggestions by Dall and Pilsbry, and the restored names of neglected authors like Bolten and Perry, are incorporated.

Compared with other large museums the staff is weak. Instead of two or three or four naturalists that we find elsewhere, there is but a single scientific officer. He is aided by a couple of attendants who perform such mechanical work as labeling, registering or packing. There is no departmental artist.

The maintenance of so large a collection is sufficient occupation for the time of a single officer, and the increase of the collection is therefore slow. To attempt any field work is contrary to the traditions of the institution. Englishmen, both at home and abroad, loyally contribute to their great museum. But the casual efforts of amateurs do not give the results of professional collectors. So that additions are sporadic and usually consist of chance gifts from the friends of the museum and small purchases of dealers.

Unlike other museums of the front rank, South Kensington produces no official conchological publication and lacks the organization and inspiration which such would afford.

It follows that the London collection, which was once the largest in the world, will cease to be so in the near future, if indeed it has not already lost this supremacy.

This year the veteran Mr. E. A. Smith retires to enjoy a well-earned pension. For half a century he has helped the conchological workers of the world. And we from the ends of the earth, alike with these in the center of civilization, cannot find expressions to convey our appreciation of his patience, his geniality and his learning. We are like the Fijian chief who exclaimed, "Would that we were dogs, that by the wagging of our tails we could show what we feel."

TWO NEW AMERICAN LAND SHELLS COLLECTED BY MESSRS. HEBARD AND REHN.

BY H. A. PILSBRY.

The form described below was taken at Garrison, Montana by Messrs. Morgan Hebard and J. A. G. Rehn during their entomological expedition of 1909. On superficial examination it was at that time referred to *O. alpina* Elrod. A few specimens had been picked up also at Garrison by Mr. E. M. Kindle in 1907 and transmitted to me by Mr. J. H. Ferriss. Both lots consist of "dead" shells only. Doubtless where the "bones" are so abundant as to attract the attention of non-conchological naturalists, there are plenty of living snails to be found hard by.

OREOHELIX CARINIFERA, n. sp.

The shell is lenticular, carinate, umbilicate, the width of umbilicus between a fourth and a fifth that of the shell, whorls $4\frac{1}{2}$, slowly increasing, the first $2\frac{1}{2}$ strongly convex, obliquely striate, the striæ finer on the embryonic portion. Subsequent whorls are strongly convex around the upper (inner) part, becoming concave near the outer edge; the striation is rougher, and some weak traces of spiral striæ appear in places. The last whorl is noticeably concave above and below the peripheral keel; it descends very slightly or not at all in front, and on the base there are very inconspicuous, well spaced spirals composed of granules. The oblique alt. and the diameter of the apeture are equal, and there is a slight angle at the termination of the keel.

Alt. 5, diam. 9.4 mm.; width of umbilicus 2 mm.; oblique alt. and diam. of aperture 4 mm.

Garrison, Montana. Type and paratypes No. 99253 A. N. S. P.

Oreohelix alpina Elrod, which comes from high elevations (8,500–9,000 ft.) in the Mission Mountains, is about the size of this snail, but the whorls are less convex, the convexity of the later ones is simple, while in *carinifera* there is a concavity above the periphery. *O. alpina* has no spiral sculpture or granulation, and the keel is less pronounced. I regard such similarity as exists as due to convergence rather than to actual relationship. *O. hemphilli* Nc. differs in the sculpture and shape of the embryonic whorls.

O. carinifera is one of the smallest Oreohelices, the dimensions given above being those of the largest shell out of about 20 in the two lots seen. A very similar small form was taken with *O. haydeni* in the Wasatch Mountains many years ago by the Wheeler Expedition, but I think it will prove to be distinct. Its exact location in that range is not known, and it was not among the forms taken by Hemphill there.

HOLOSPIRA MESOLIA, n. sp.

The shell is cylindric-fusiform, of a delicate pink-white tint, the upper part white with blue stains; dead shells white throughout. Whorls 14, the first $2\frac{1}{2}$ smooth, forming the mamillar embryonic shell, the first whorl rapidly increasing, second swollen, next half whorl very narrow. Subsequent whorls are nearly flat, rather finely but strongly striate, regularly increasing to the 8th or 9th whorl,

where the shell reaches its greatest diameter. After that the whorls are nearly smooth, rather glossy, and the shell diminishes slowly in diameter to the base. The last two whorls have retractive axial ribs which gradually increase in strength, and are strongest on the straight part of the last whorl and base. The last whorl is somewhat compressed laterally and projects, carrying the aperture well forward. Aperture is very shortly ovate, almost circular, light brown within. Peristome very broad, flatly reflexed, white. The internal axis is smooth throughout, rather slender, tapering downwards, with a diameter of about 1 mm. in the widest part.

Length 23.5, greatest diam. 6 mm.; whorls 14.

Length 22.6, greatest diam. 6.3 mm.; whorls $13\frac{1}{2}$.

Length 20, greatest diam. 5.8 mm.; whorls $12\frac{3}{4}$.

Sanderson, Terrell Co., Texas, on a low limestone ledge along the railroad. Elevation 2800–2900 ft. Types no. 107001 A. N. S. P., collected August 25, 1912 by Messrs. Morgan Hebard and J. A. G. Rehn.

This handsome *Holospira* is most closely related to *H. semisculpta* Stearns, which was described from a canyon above San Carlos, Chihuahua, a place on the Mexican side of the Great Bend of the Rio Grande. Dr. Dall and Dr. Bartsch have kindly compared specimens with the type of *semisculpta*, and report that the new species "differs in the profile, which in your shell is more contracted toward the base, rendering it spindle-shaped, while the former is more cylindrical. The ribs in yours do not extend over so many of the basal whorls, and the expanded peristome gives it a very distinct appearance. It is doubtless a distinct species."

With the *Holospira* were found specimens of *Polygyra texasiana texasensis* and a *Succinea*.

SHELLS OF SOUTHEAST MISSOURI.

BY F. A. SAMPSON, COLUMBIA, MO.

During a late trip through southeast Missouri I had a few hours' time for collecting shells, and the result, combined with some former collecting, is here given.

Fern Glen, St. Louis County.

This is on the Merimac river, twenty-one miles from St. Louis. The rock exposures are of Chouteau and Burlington limestone, but none of the shells were found in abundance.

Polygyra zaleta Binn. These cannot be distinguished from Ohio specimens, and are of about the same size, up to 29 mm. diameter. From other places in Missouri I have the *P. zaleta ozarkensis* of 19 mm. or less diameter, contrasting quite sharply with these.

Polygyra thyroides Say. I found only dead shells, but doubt not that on the low ground living ones could be found.

Polygyra clausa Say. Dead shells not differing from others in the state.

Polygyra pennsylvanica Green. A single shell that looks like a postpliocene fossil, but I think it is not such. I have found it in the postpliocene at Providence, Boone county, and living as noted below.

Polygyra elevata Say. Typical shells.

Polygyra appressa Say. With rather heavy striation, and from 17½ to 25 mm. diameter.

Polygyra fraudulenta Pils. Rather more numerous than any other kind, and not found in Missouri except in localities noted on this trip.

Polygyra inflecta Say. Three dead shells. The umbilicus of two was not covered. Similar specimens are noted from Shepard's Mountain and from Rivermines.

Polygyra hirsuta Say. A single shell. Pilsbry says that evidence is wanting to show that this is found west of the Mississippi and south of Kansas and Pettis County, Missouri whence I reported it some years ago. The shell from this place and those from two other places, hereafter noted are of this species; they certainly are neither *blandiana* nor *uncifera*.

Polygyra fraterna Say. With quite small umbilicus.

Polygyra dorfeuilliana Lea. This is the farthest north that I have found this species.

Pyramidula solitaria Say. A single shell, which like the *pennsylvanica* looks like a postpliocene fossil but I do not think it is such.

Circinaria concava Say. A number of dead shells up to 29 mm. diameter.

Bifidaria armifera Say.

Pupoides marginata Say.

Gastrodonta ligera Say.

Vitrea indentata Say.

Physa gyrina Say. In a small pond by the side of the railroad track.

From a pile of mussel shells left by a pearl-hunter I noted seventeen or eighteen species.

Kemmswick, Jefferson County.

Polygyra appressa Say. A search by the railroad and on the bluff above gave a single dead shell of this species, but no other.

Washington County.

Here we are getting away from the limestone formations, and shells are scarce.

Polygyra fraterna alicia Pils. Mineral Point.

Bifidaria armifera Say. Potosi.

Pupoides marginata Say. Potosi.

Zonitoides arboreus Say. Mineral Point.

Zonitoides minusculus Binn. Potosi.

Vitrea indentata Say. Potosi and Mineral Point.

Physa gyrina Say. In a spring branch at Potosi. In a large stream close by no shells were found. A swift-flowing clear stream at Mineral Point did not show any shells.

Ironton, Iron County.

Polygyra albolabris alleni Weth. A single dead shell was found on Shepard's Mountain adjoining the town. The other land shells were found at the same place.

Polygyra inflecta Say. The umbilicus of the single shell found was not covered.

Polygyra dorfeuilliana Lea.

Zonitoides arboreus Say.

Physa gyrina Say. In a spring branch. In a larger stream close by no shells were found.

St. Francois County.

Polygyra thyroides Say. Farmington and Rivermines, the latter 19½ to 25 mm. diameter.

Polygyra appressa Say. Farmington. One of the shells did not have the umbilicus covered.

Polygyra inflecta Say. Rivermines. In three of the shells the umbilicus was not covered.

Polygyra monodon Rack. Rivermines. The small, widely umbilicated shell, not distinguishable from the northern shell, except that the color is not uniform, but usually more or less in stripes with the lines of growth alternately light and dark-colored. A shell from Jackson, Cape Girardeau county, shows the same stripes.

Polygyra fraterna aliciæ Pils. Farmington and Rivermines.

Pyramidula solitaria Say. Farmington.

Pyramidula alternata Say. Farmington and Rivermines.

Pyramidula perspectiva Say. Farmington and Rivermines.

Bulimulus dealbatus Say. Rivermines.

Pupoides marginata Say. Rivermines and Farmington.

Bifidaria armifera Say. Rivermines and Farmington.

Zonitoides arboreus Say. Rivermines and Farmington.

Vitrea indentata Say. Rivermines.

Helicodiscus lineata Say. Farmington.

Cape Girardeau County.

Three places in this county were visited: Allanville in the White-water river bottom, Cape Girardeau on the Mississippi river, and Jackson on higher ground between.

Polygyra albolabris alleni Weth. Cape Girardeau.

Polygyra thyroides Say. Allanville and Cape Girardeau, the largest from the former, 28½ mm. diameter.

Polygyra clausa Say. Jackson.

Polygyra pennsylvanica Green. Jackson. This is the only place in the State where living shells have been found.

Polygyra fraudulenta Pils. Allanville. Somewhat larger than those from Fern Glen, 17½ mm. diameter.

Polygyra appressa Say. Cape Girardeau, Allanville. Those from Cape Giradeau vary from the small light colored, very finely striated shells to the larger, dark colored, coarsely striated, but not the same as large, dark reddish colored ones from Allenville, which Pilsbry reports similar to some Arkansas and Illinois shells. They are an unusual variety. An interesting specimen shows that by some injury a part of the last whorl was broken away, and a new

lip was formed more than a half-whorl short of the original one. The original parietal tooth is more than a half-whorl beyond the new one.

Polygyra inflecta Say. Cape Girardeau.

Polygyra leporina Gld. Jackson.

Polygyra monodon Rack. Jackson. See remarks under St. Francois County.

Polygyra fraterna imperforata Pils. Cape Girardeau.

Polygyra hirsuta Say. Jackson and Allanville, the latter the larger.

Pyramidula alternata Say. Jackson and Allanville.

Pyramidula perspectiva Say. Allanville and Jackson.

Omphalina friabilis W. G. B. Cape Girardeau. Pilsbry and Ferriss distinguish this species from *fuliginosa* largely by the appearance of the apical whorls, these being smooth, whitish-corneous and unworn, while in southwestern *fuliginosa* the summit is invariably worn, the cuticle removed from the earlier whorls. The shells from Cape Girardeau are very fine, measuring 28 mm. diameter, and the apex not worn in the least.

Vitrea indentata Say. Allanville.

Zonitoides arboreus Say. Cape Girardeau and Allenville.

Helicodiscus lineata Say. Allanville.

Succinea sp. Cape Girardeau.

Physa gyrina Say. Allanville and Jackson. From a pond on the west side of the Whitewater river at Allanville. The shells were small; from one on the east side a single larger one and of short spire.

Sphaerium solidulum Prime. Jackson.

Musculium elevatum Hald. Jackson.

Musculium transversum Say. Jackson.

St. Genevieve, St. Genevieve County.

Polygyra appressa Say. Found more abundantly than any other, and more like those from central Missouri than others herein noted.

Polygyra fraterna Say.

Polygyra fraterna imperforata Pils. Of ten *fraterna* found six were imperforate, and the others almost so.

Polygyra inflecta Say.

Pupoides marginata Say.

Bifidaria contracta Say.

Bifidaria procera Gld.

Lymnæa obrussa Say. In a spring branch these and the two following were found.

Physa gyrina Say.

Pisidium sp.

SPHÆRIIDÆ, OLD AND NEW, II.

BY V. STERKI.

PISIDIUM PERALTUM St. THE NAUTILUS, XIV, p. 5, 1900.—Specimens have been received from some other places: near Douglas Lake, Cheboygan Co., Mich., collected by Mr. H. B. Baker, and Cedar Lake, Lake Co., Ill., by Dr. F. C. Baker. But those from Ky., Ill. and Ia., formerly referred to *peraltum*, are distinct and range with the following:

PISIDIUM FRAUDULENTUM, n. sp.—Mussel of medium size, barely longer than high, somewhat oblique, rather well inflated; superior margin curved, passing with angles into the adjoining; supero-anterior slope well marked, steeply oblique, straight or nearly so, anterior end a rounded angle situated near the ventral side, inferior margin rounded, posterior truncate at right angles to the longitudinal axis; beaks rather large, rounded or somewhat flattened on top, moderately projecting over the upper margin; surface dullish or with a silky gloss, rather smooth, with fine, crowded, somewhat irregular striæ; color corneous to yellowish; shell opaque or subtranslucent, rather strong, hinge strongly angular, curved, very stout, its whole surface rugulose; right cardinal tooth angular, enclosing a deep excavation for the left anterior, often emarginate in the middle, its anterior part thin, the posterior very thick and usually grooved; left anterior rather short and massive, strongly curved upward, with apex pointed, the posterior short, steep oblique, slightly curved; ligament and resilium rather short, the latter strong.

Long. 4.5, alt. 4.3, diam. 3 mm. (100 : 95 : 66).

Habitat: Va., Ky., Ill., Ia., Mo., Miss.; ditch on the Cameron Run, west of Alexandria, Va., No. 602, types, and Roach's Run, Va.,

opposite Washington, D. C. (No. 628), both in tide water, collected by myself, Oct. and Nov., 1896; Bowling Green, Ky., Habana, Ill., Iowa City, Ia.; as mentioned (under *P. peraltum*, l. c.); creek below Elizabethtown, Ill., collected by Mr. A. A. Hinkley, 1894 (received 1904); Flat Creek, Pettis Co., Mo., by Mr. F. A. Sampson, and from the same place in Mr. Bryant Walker's collection; northeastern Mississippi, collected by Mr. A. A. Hinkley.

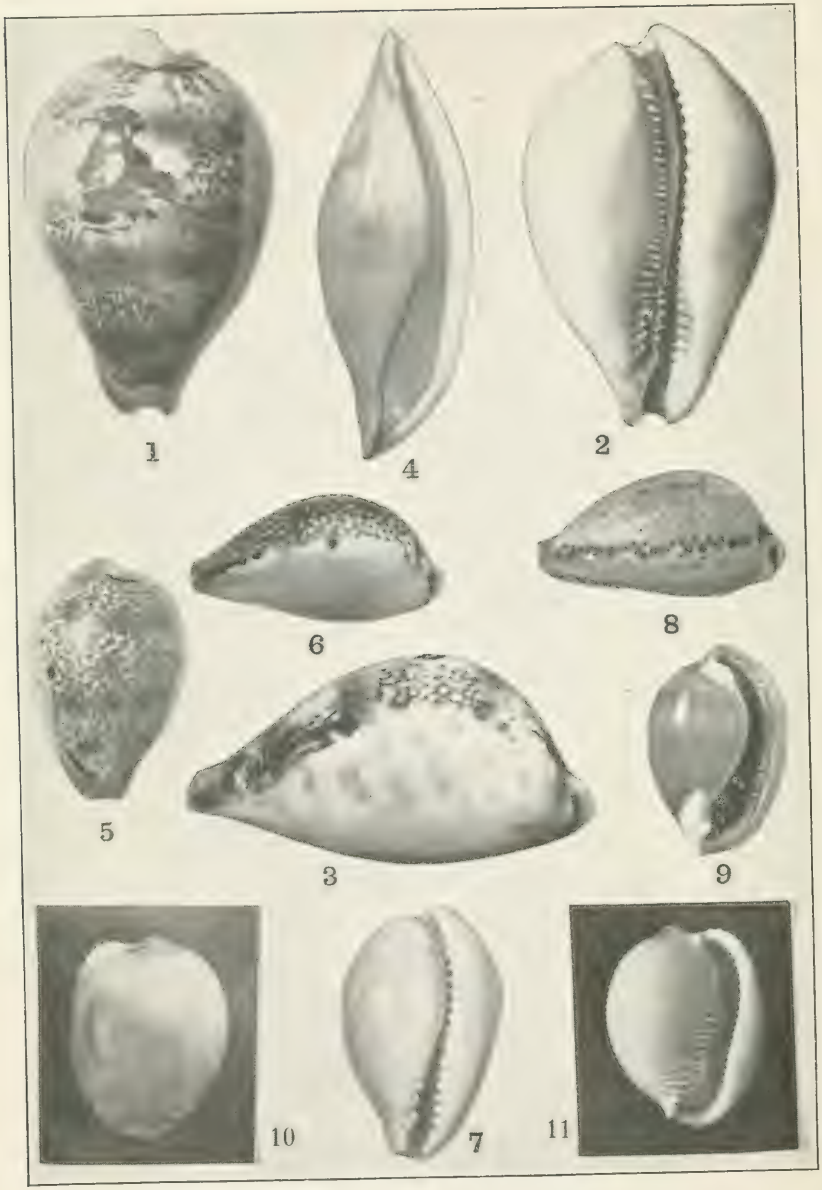
This differs from *P. peraltum* as follows: the superior margin is somewhat less curved, the angle formed by it and the supero-anterior slope is more projecting; the mussel is larger but somewhat less inflated; the color is corneous to yellowish, that of *peraltum* is pale corneous to nearly colorless or grayish, and the shell is more translucent; the surface of *P. fraudulentum* is more dull. As written, these differences may not appear striking, but they are constant so far as known; *P. fraudulentum* is remarkably uniform.

It appears also that our species ranges near some forms of *P. compressum*, and is of the same group; but the mussel is not so oblique, the beaks are broader and without ridges; moreover, the two were found associated at several places, and distinct.

(*To be Continued.*)

NOTES.

Cincinnatia in the Delaware Drainage.—On October 1, 1912 Mr. Delos E. Culver collected some pond-weeds at the settling pond on Darby Creek near Addingham, Delaware Co., Pa., which contained living specimens of *Cincinnatia cincinnatiensis* Anth. and the following other species of shells: *Planorbis antrosus* Conr. *parvus* Say; *dilatatus* Gld.; *Lymnaea columella* Say; *Physa heterostropha* Say; *Campeloma decisum* Say (one specimen is sinistral); *Amnicola limosa* Say; *Lyogyrus granum* Say; *Musculium transversum* Say; *Pisidium noveboracense* Pr.; *variabile* Pr.; *compressum* Prime. So far as I know, this is the only record of *C. cincinnatiensis* in the Delaware drainage, or anywhere between New York state and the Potomac River.—E. G. Vanatta.



1-3. CYPRÆA HIRASEI ROBERTS.
4. OVULA HIRASEI PILS.
5-8. CYPRÆA HUNGERFORDI KIIENSIS ROBERTS.
9. OVULA NIPPONENSIS PILS.
10, 11. TRIVIA EOS ROBERTS.

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NEW CYPRÆIDÆ.

BY S. RAYMOND ROBERTS.

Recently there was sent to me for examination by Mr. Y. Hirase, Kyoto, Japan, a small but extremely interesting lot of shells, mostly belonging to the *Cypræidæ*, two species of which I believe to be new to science.

CYPRÆA HIRASEI, n. sp. Plate 7, figs. 1, 2, 3.

Shell pyriformly ovate, extremities produced, base convex; only moderately calloused laterally, the callus extending well up the dome on the left side, but not on the right. Dorsal surface longitudinally and spirally faintly ridged or malleated in irregular spiral series,[1] this sculpture obsolete towards the anterior end. Aperture nearly straight, the upper fourth a little curved; inferior third a little dilated; teeth small, about 27 on each side and well within the aperture. Ground work of dorsal surface creamy white, three banded with flesh color, over which there is a tracery or imperfect reticulation and near the borders of the lateral calluses a few blots of yellowish brown; topped with a conspicuous irregular blotch of a darker shade. Extremities pink, base white, sides, especially the left side, faintly spotted pinkish brown.

Length 51, diam. 32, elevation 26 mm.

Habitat, Tanabe, Kii Coast, Japan (Hirase).

[1] This malleation, while conspicuous enough in the shell does not show in the photographic figure. It resembles the malleation of a rough *Lymnæa palustris*.

The sculpture and pattern of the dorsal surface of this beautiful shell resembles somewhat that of some ovate examples of *C. subviridis* Rve., it differs however in having the spire produced, instead of sunken; the aperture is less curved posteriorly, the teeth more numerous and the sides faintly spotted, the form of the columella within the aperture is also entirely different, being broad and excavated, with a second series of about 6 teeth deep within.

But one specimen was obtained which belongs to the collection of Mr. Hirase, in whose honor it gives me great pleasure to dedicate the species.

Mr. Hirase sent me also two specimens of a Cypraea which after as exhaustive a study as I have been able to make, I am inclined to consider a strongly marked variety if not sub-species of *C. hungerfordi* Sowb. The following description is therefore offered.

CYPRÆA HUNGERFORDI KIIENSIS, n. subsp. Pl. 7, figs. 5, 6, 7, 8

Shell pyriform, dorsal surface creamy white, closely freckled with light chestnut-brown spots and indistinctly banded with pale purplish-brown clouds or diffuse spots; extremities, sides and base salmon, the sides more or less spotted with blackish-brown, along the edges of the lateral calluses. Aperture nearly straight, teeth in outer lip rather coarse, 17 or 18 in number, those on columella marginal, white, somewhat smaller and extending well within the aperture.

Length 31, width 19¼, alt. 15½ mm.

Length 31, width 19, alt. 15 mm.

Habitat, Kii coast, Japan (Hirase). The dorsal surface of a specimen not fully mature is faintly ornamented with a broad, brownish band, the spots on the sides are more numerous and run together (fig. 9).

Compared with the description of the typical *C. hungerfordi*, a shell which I have never seen, it has fewer teeth and the margins are *not thickened*. This is obvious in figs. 5–7, which represent a shell certainly adult. The coloration is also quite different and were it not for the locality from which it was obtained, I might claim for it recognition as a full species.

There were also in the collection, much larger specimens of *C. cernica* Sowb. than I had before seen, and *Trivia insecta*, Mighels, *grando*, Gask., *oryza*, Lam. and *pilula* Kien. This last shell, which heretofore I had placed in the synonymy of *Trivia globosa* Gray, is

to my mind undoubtedly entitled to specific distinction, which more recent observers have accorded it.

TRIVIA EOS, n. sp. Plate 7, figs. 10, 11.

Shell globosely ovate with rounded base, white, rather finely ribbed. Dorsal line indicated by a narrow smooth area from which ribs diverge in every direction, a few being interposed on both sides; posteriorly they pass directly over the spire, which projects well, showing five whorls. On the ventral side the spiral ribs have an oblique trend and extend well into the aperture, where they decrease in number and become coarser. The aperture is rather narrow, but slightly wider anteriorly, outer lip thickened outside, strongly ribbed transversely, with about 29 ridges forming teeth on the inner margin; retracted anteriorly. The inner lip bears a very small callous projection above, and near the base there is a rounded ridged lobe projecting inward.

Length 25.7, diam. 20, alt. 17 mm.

Habitat, Boshu, Japan (Hirase).

This magnificent *Trivia* is named for the "Sunrise Kingdom." Type in the collection of Mr. Hirase. In size it is approached only by *T. oniscus* Lam. of South Africa, which however differs by its pink color, larger smooth dorsal area, fewer ribs, shorter spire, and especially by its much wider aperture, as in other members of the South African group of Trivias, to which *T. eos* has but little affinity. It should be noted that the irregularity on the left side of fig. 10 is wholly an effect of light in the photograph, as that slope of the shell is perfect and evenly curved.

A COLLECTOR IN WESTERN CUBA AND THE ISLE OF PINES.

BY REV. H. E. WHEELER.

A mid-winter vacation is of such rare occurrence in a minister's career that the generosity of a congregation that made such a thing possible deserves special mention. It was my purpose to join my genial correspondent, Mr. Walter F. Webb, at Baracoa on the North Coast of Cuba, for which port he sailed early last January, but it turned out that we were separated by the length of the island, and my excursion to the Oriente Province was abandoned. Enroute

for Havana I had the unexpected good-fortune to be on the first regular train which passed over the sea-going extention of the Florida East Coast Railway, completing the line from Knight's Key to Key West.

Shortly after my arrival in Havana, I met Dr. Carlos de la Torre, Curator of the Zoological Department in the Academy of Sciences, Havana, and Professor of Biology and Zoology in the University of Havana, and before I could protest I found myself in the toils of characteristic Cuban hospitality. The Doctor's contributions to the literature of Cuban malacology are too well known to readers of the NAUTILUS to need any reference here, but it may not be so well known that he was the favorite pupil of Felipe Poey, the most brilliant naturalist which Cuba has produced.

To see his collection is worth the expense of a trip to the Antilles. So far as the described Cuban fauna is concerned it is almost complete. Here are specimens of nearly every species, and for the display of a variable shell like *Polymita picta*, Born, or *Coryda alauda*, Fer., many ample drawers are required. You may see specimens of *Licina percrassa* (Wright) Pfr., rarest of Cuban mollusks, and of which no living examples have ever been found. Its habitat is Luis Lazo, Pinar del Rio Province, in one of the highest peaks of the Sierra de Los Organos.

In fact a drawer of Cuban shells calls up many a vivid scene and many an honored name among the students of molluscan life. Poey and Gundlach and Pfeiffer seem to spring out of the past, speaking with such versatility that you give them respectful audience; in your imagination Wright and Arango are on the trail of a hundred new species which unaccountably have been overlooked; the Count Morelet is on the high seas again exploring regions that no naturalist ever saw before him; and Férussac is rampant with chagrin that some oft-handled snail is crawling about with a name wholly unworthy of its race.

Once on Cuban soil, under the spell of matchless evening skies, the dormant or overworked energies aroused by all that a tropical winter can be, why should one sleep? A single rainy day at Ceiba Mocha, at Rangel, or on any limestone mountain-side, and how shall arid plains or denuded hillsides, where only shells of somber hue and homely feature care to dwell, claim any longer a collector's enthusiasm? For here is *life* and color and health, not only in the

lowly kingdom of crawling things, but for the student also who searches out their haunts.

It was quite natural that the first shells collected by the writer should have been those introduced by commerce, namely, *Rumina decollata*, Linn., and *Subulina octona*, Brug., but surely I must have seemed, both to natives and tourists, more like an escape from some asylum than a would-be naturalist, engaged, as I was, in turning over unceremoniously the flower-stands in the Parque de Colon, right in the heart of Havana.

It was 1878 that Arango published a catalogue[1] of Cuban shells which included also those from the Isle of Pines. In it 578 land forms alone are enumerated, but since that list was prepared more than a hundred species and sub-species have been described. But this is only a numerical evidence of the richness of the fauna.

Arango's collection is at the Academy of Sciences, and Gundlach's "Museum" may be seen at the Institute. His (Gundlach's) observations were published only after the most painstaking study; birds, reptiles, insects, and shells all claiming his interest. With a conscience for accuracy which is the naturalist's only passport in the scientific world, he would delay the taxidermy of a mammal or bird until he understood its anatomy and had become thoroughly familiar with its habits.

Though I have hardly a bowing acquaintance with ornithology, there were some birds which interested me. Among them was a Phæthon,[2] the nearly extinct "guacamayo" (*Ara tricolor*), and the "carpintero real" (*Picus bairdi*). The stately flamingo (*Phœnicopterus ruber* Linn.) is common enough, I suppose, but of irresistible plumage.

I was attracted by a turtle (*Emys rugosa*), which I saw in great numbers near Camoa, and my attention was called to a curious fresh-water fish[3] which has survived the evolutional changes of nobody knows how many thousand years. Here also could be

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[1] "La Fauna Malacologica Cubana, par Rafæl Arango y Molina," Havana, 1878.

[2] *Phæthon flavirostris* Brandt, the only representative of the *Phæthontidæ* which visits our Eastern seaboard.

[3] *Lepistosteus* (*Atractosteus*) *tristachus*, Block, a species still living in Mexico and the Southern United States.

studied that rare insectivorous mammal, which from its channeled teeth, is called *Solenodon* (*S. cubanus* Peters). There is a related species[1] in Santo Domingo, but nowhere else, I believe, except in Madagascar, is there an animal, the *Centetes*, at all like it. The Hutia, a large rodent, which in war times was hunted for food, is represented by three species,[2] but one of these, as well as the *Solenodon*, belongs to the fauna of Eastern Cuba.

At the University of Havana nothing is more touching than the regard in which Felipe Poey is held. His statue, a magnificent work of art, is the chief memorial in the quadrangle, and his library with many interesting relics, and many of his types have their repository in the spacious Museum. The present University, by the way, represents only one of the many far-seeing services rendered the Cuban people, during the American intervention, by Gen. Leonard Wood. He converted the old ordnance factories into University buildings which now fittingly crown the Vedado.

At the time of my visit the Professor's assistants were mounting a recently captured ray (*Lebisa*), a fish well known by name only to Poey and mentioned in his several works, but which has never been described.[3] This curious inhabitant of the Caribbean Sea is from one to two meters in diameter, having a rough spiny skin which has been used by the natives as a dish rag. It has a long, slender, sharply-pointed tail, near the base of which are erected two obliquely-set and forbidding spines, which look much like the stoutly grown thorns of a healthy locust tree.

For one who is interested in botany the notes of A. Richards in Ramon de la Sagra's "*Historia Fisica Politica y Natural de Cuba*," will be found instructive, and other works, such as the "*Flora Cubana*," of Sauvalle, the "*Flora Havanensis*," of Gomez de la Maza, and the "*Flora of the British West Indian Islands*," of Grisebach, have an honorable place among the older authorities.[4]

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[1] *Solenodon paradoxus* Brandt.

[2] *Capromys fournieri*, Desmarest; *C. prehensilis*, Poeppig; and *C. melanurus*, Poey.

[3] The description will appear in Poey's "*Ictiologia Cubana*," which Dr. de la Torre is now editing for publication.

[4] This painstaking catalogue has the advantage of being written in English. Its author, A. H. R. Grisebach, M. D., was Professor of Botany in the University of Göttingen, and the first edition was published in London in 1864.

Of characteristic trees one should mention the gigantic *Ceiba*,[1] the "West-Indian God-tree," with its strangely distorted and buttressed trunks; the *Almacigo*,[2] whose maroon-red bark peels off much after the fashion of our sycamore; and a heavy-foliaged evergreen, the Indian laurel[3] everywhere abundant. The deep holes which often corrugate the trunk of the last-named species are favorite retreats for *Liguus fasciatus*, Müll., and the common *Eurycampta bonplandi*, Lam. On the Güiness road near Camoa, I took sixteen specimens of this noble shell from the "crevices" of a single tree.

At Matanzas I saw the *Salvadera*,[4] a rather large tree whose fruit, when fully ripe, discharges its wedge-shaped seed from a large spherical pod with a violent explosion. When such a catastrophe overtook one of my specimens in my room at the hotel, I am not sure but that the other guests had good cause to suspect a suicidal termination of an unclassified American.

On my trip to Camoa I collected a shrub, the leaflets of which strongly reminded me of our native holly. That evening my Cuban host, seeing what I had in my bag, held up his hands in horror, crying, "*Guao! Guao!*," and immediately calling some tongs into requisition, unceremoniously disposed of my beautiful plants. I had collected one of the most poisonous plants[5] on the Island. A terrible pain and swelling usually attends infection, often fever, and some natures are so sensitive to it that they cannot pass under its shade without being poisoned. But though it was prophesied that I would pay dearly the penalty of my ignorance, no appreciable inconvenience was suffered. Being already immune to its relative, our common poison-oak,[6] I am tempted to experiment next with that unnamed plant which Professor Simpson so utterly abhorred.[7]

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[1] *Ceiba pentandra* Gaertn. —*Eriodendron anfractuosum D. C.*

[2] *Bursera gummifera* L., of the older authorities, now called *Elaphrium simaruba* (L.). This tree is common in Florida, there being known as the "*gumbo-limbo.*" [3] *Ficus nitida* L.

[4] *Hura crepitans* L., of the family *Euphorbiaceæ*, called in English-speaking countries "*sand-box.*"

[5] *Comocladia platyphylla.* Another member of this genus which occurs in the Western provinces of Cuba is *C. dentata.* The (*Hippomane mancinella* L.), however, is a much more dangerous plant, and immunity from one class of poisons does not justify such a prospect in respect to others.

[6] *Rhus radicans* Linn. [7] See "Collector's Journal," Vol. I, No. 4, in loco.

Ceiba Moche, a little village of thatched cabins near Matanzas, is a famous place for shells. Though the season was unusually dry, I collected the following species there in a few hours:

Oleacina oleacea, Fér.
Oleacina solidula, Pfr.
Thysanophora vortex, Pfr.
Cysticopsis debilis, Pfr.
Cysticopsis cubensis, Pfr.
Helix (Microphysa) stigmatica, Pfr.
Jeanneretia multistriata, Desh.
Eurycampta bonplandi, Lam.
Thelidomus auricoma, Fér.
Liguus fasciatus, Müll.

Urocoptis scaeva, Gund. One of the two sinistral representatives of this genus found in Cuba, the other being Urocoptis coronadoi, Ar., from Marianao, near Havana.

Urocoptis fortis, Gund.
Urocoptis gracillima, Poey.

Urocoptis philippiana, Pfr. This beautiful species has not been previously reported from this locality. It had chosen a piece of wall unoccupied by other Urocoptids, and seemed to have developed a prosperous colony.

Megalomastoma apertum, Poey.
Ctenopoma rugulosum, Pfr.
Chondropoma dentatum, Say.

Chondropoma pictum, Pfr. This species is distinct from *pfeifferianum*, Poey. The animal differs by having red tentacles, and in the shell the peristome is simple. The sexes are separate, the male being always about one-third smaller than the female. On the female shell is generally to be seen a white mark caused by the abrasive contact of the male.

Eutrochatella sloanei, Orb.
Helicina adspersa, Pfr.
Alcadia hispida, Pfr.
Emoda submarginata, Gray.
Alcadia nitida, Pfr.

The *Jeanneretia multistriata* calls to mind a bit of history. Ch. Jeanneret was a Swiss watch-maker who, in 1868, was living at Santiago de Cuba. He discovered many important species, and was a valued correspondent both of Gundlach and Poey. But being taken for a spy during one of the political uprisings he was shot from across the river. His collection was lost. The subgenus *Jeanneretia*, erected by Pfeiffer in his honor, is a genuine Cuban group, and is remarkable for its spiral ridges. Its most typical representative is *Jenneretia sagraiana*, named by A. d'Orbigny in honor of Don Ramon de la Sagra, the author of the famous "*Historia fisica, politica y natural de la Isla de Cuba*," 10 volumes, Paris, 1840–1850.

Another species which bears the name of an almost forgotten naturalist is *Helix parraiana*, Orb. D. Antonio Parra was a native of Spain, and has the distinction of having written the first work on Cuban fishes. This was published in 1787, the engravings being made on wood by his son. His expedition was furnished by the Museum of Madrid, but his work on the fishes and crustaceans was printed in Cuba.

The Loma de Camoa[1] is a locality which has been thoroughly explored, but as it can be reached in an hour from Havana on the electric railway, it is impossible to pass it by. Here I collected the following species:

Oleacina oleacea, Fér.
Oleacina solidula, Pfr.
Oleacina subulata, Pfr.
Polygyra paludosa, Pfr.
Helix (Microphysa?) stigmatica, Pfr.
Cysticopsis cubensis, Pfr.
Thysanophora vortex, Pfr.
Jeanneretia multistriata, Desh.
Thelidomus auricoma, Fér.
Eurycampta bonplandi, Lam.

Liguus fasciatus, Müll. At Cardenas this species is white, generally devoid of all markings, save occasionally a few green lines on the last whorl. But at Matanzas—less than twenty-five miles to the west—it is richly adorned, and like Joseph's coat, with many colors, and the apex is almost invariably a rosy hue.

Urocoptis humboltiana, Pfr.
Urocoptis cyclostoma, Pfr.

Urocoptis ischna, Pils. I am convinced that ischna is only a form of cyclostoma. The smooth form is generally found in the stone walls at the base of the hill, and on either side of the provincial road, but with it is a costate form that links it with the ribbed variety. This (ischna) is usually collected on the exposed cliff above where the heat of the sun would supposedly develop such a protective sculpture, and a series of specimens can be laid down showing the imperceptible transition from the typical and original form down to the elaborately ribbed variety.

Succinea sagra, Orb.
Cistula catenata, Mke.
Chondropoma dentatum, Say.
Chondropoma pfeifferianum, Poey.
Proserpina depressa, Orb., a species without operculum.
Eutrochatella sloanei, Orb.
Eutrochatella babei, Arango.
Helicina adspersa, Pfr.
Alcadia nitida, Pfr.

[1] *Loma* = hill; otherwise known as "Jamaica," and for that reason a frequent occasion for confusion of localities.

The following species are also known from this locality:

Hyalinia gundlachi, Pfr. Macroceramus unicarinatus, Lam.

Microceramus turricula, var. perconicus, Pils.

Melaniella acuticostata, Orb. Urocoptis camoensis, Pfr. and

Vertigo pellucida, Pfr., which I found abundantly at Mariano. In a small "laguna" near Camoa I found *Ampullaria conica*, Wood, a *Planorbis*, *Ancylus havanensis*, Pfr., and *Physa cubensis*, Pfr.

At Guanabacoa in the Havana Province there is a vigorous colony of *Carocolus sagemon*, var. *semiaperta*, Mart., which has a curious history. The species belongs to Eastern Cuba. Some fifty years ago Dr. Nicolás Gutierrez, the founder of the Academy, and one of Cuba's most distinguished scientists, put some young *sagemons* in his garden at S. Francisco de Paula, near Guanabacoa. They were typical *Caracolus arangiana* in different colors, some with and some without umbilicus. But all are now umbilicated, and correspond precisely with the variety named by Martens, *semiaperta* (not in Arango), which came originally from the Cauto river near Bayamo.[1]

Cardenas and Matanzas are well worth a visit whether one has visions of snails or not. The former city—the fifth in size on the Island[2]—is 106 miles from Havana by rail, and its commerce in honey, mahogany and asphalt has been augmented greatly by American enterprise. Indeed Cardenas has been called an American city, though I saw fewer Americans and heard less English there than in other western ports. However, the whole city turned out on Sunday to witness the increasingly popular American game—baseball.

I heard a missionary, whose church joined hard against a blacksmith shop, patiently compete for a hearing with its busy anvil, and just across the narrow street rang deafeningly and incessantly the electric gong of a moving picture show, which form of amusement has become as fully identified with Cuban life as it has outrun our American taste for cheap entertainment. The beautiful Bay is very ample but shallow, and lies over extensive beds of asphalt. The water is almost fresh from the constant upward flow of some mighty subterranean river, or perhaps from many streams flowing through the limestone rock of this region.

Here I found flourishing churches, well disciplined schools, and

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[1] Prof. Pilsbry considers *semiaperta* only a variety of *arangiana*.

[2] Its population is about 25,000.

an extensive Museum, whose director, Sr. Francisco Blanes, is an ardent conchologist as well as a devout Christian. In fact, the Museum owes many of its choicest collections to this generosity, and in token of their appreciation the Trustees have given him a life pension and made him honorary curator.

In the court of the new Museum building *Bulimulus sepulchralis*, Poey and *Ennea bicolor*, Hutt., the latter introduced within the past decade, had found a congenial home.

At Matanzas I was the recipient of many courtesies. Dr. Luis A. Cuni, Professor of Natural Sciences in the Instituto de Matanzas, gave me an automobile excursion through the beautiful Yumuri Valley, which lies under the protecting care of the Palenque de Matanzas, and its twin "loaf" the Pan de Matanzas.[1] We ascended the San Juan river in a trim launch getting a magnificent view of the verdant meadows and the palm-crested mountains. At the Bellamar caves our guide was an old Cuban who claimed to be their discoverer fifty years ago, and who seemed to be veritably a part of their grotesque formations. With Dr. Valdez graciously serving as interpreter, Dr. Cuni and I compared notes on Natural History, and parted the best of friends.

To the west of the city rises the Loma de Simpson. On its summit is a hermitage—the Ermita de Montserrate—which preserves a cherished memorial of Spanish ecclesiastical history. In this revered situation I collected two interesting *Urocoptids*—*U. poeyana*, Orb., and *U. elegans*, var. *auberiana*, Orb.,—and many beautiful *Liguus* from the thorny hedges of the *Euphorbia*.[2] I reached the crest of the hill in the early morning, and I shall not soon forget the panorama of La Cumbre, the mountains set against the deepest of blue skies, the Valle de Yumurí, a mighty garden of Royal Palms and tropical flowers, nor the beautiful city itself, whose buildings in dazzling white seemed to step down to the bay with stately tread. The Bay of Matanzas is an æsthetic challenge; not until you see for yourself, my gentle reader, will you believe that it has mastered the science of color and perfected the art of display.

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[1] Both of these mountains are famous for their shells. Nothing is more attractive in the cabinet than a well selected series of *Chondropoma presasianum*, Gundl., and *Chondropoma irradians*, Shutt., which can be collected on both "pans."

[2] *Euphorbia lactea*, Han.

The Matanzas fauna was studied and described by Pfeiffer. Dr. L. Pfeiffer came to Cuba from Germany with Dr. Juan Gundlach, the ornithologist, and Edward Otto, the botanist, in 1839. Pfeiffer and Otto left after a residence of two months, but Gundlach remained, and for more than fifty years he devoted his talents to the exploration of Cuba's Natural History, becoming a worthy co-laborer of Poey.

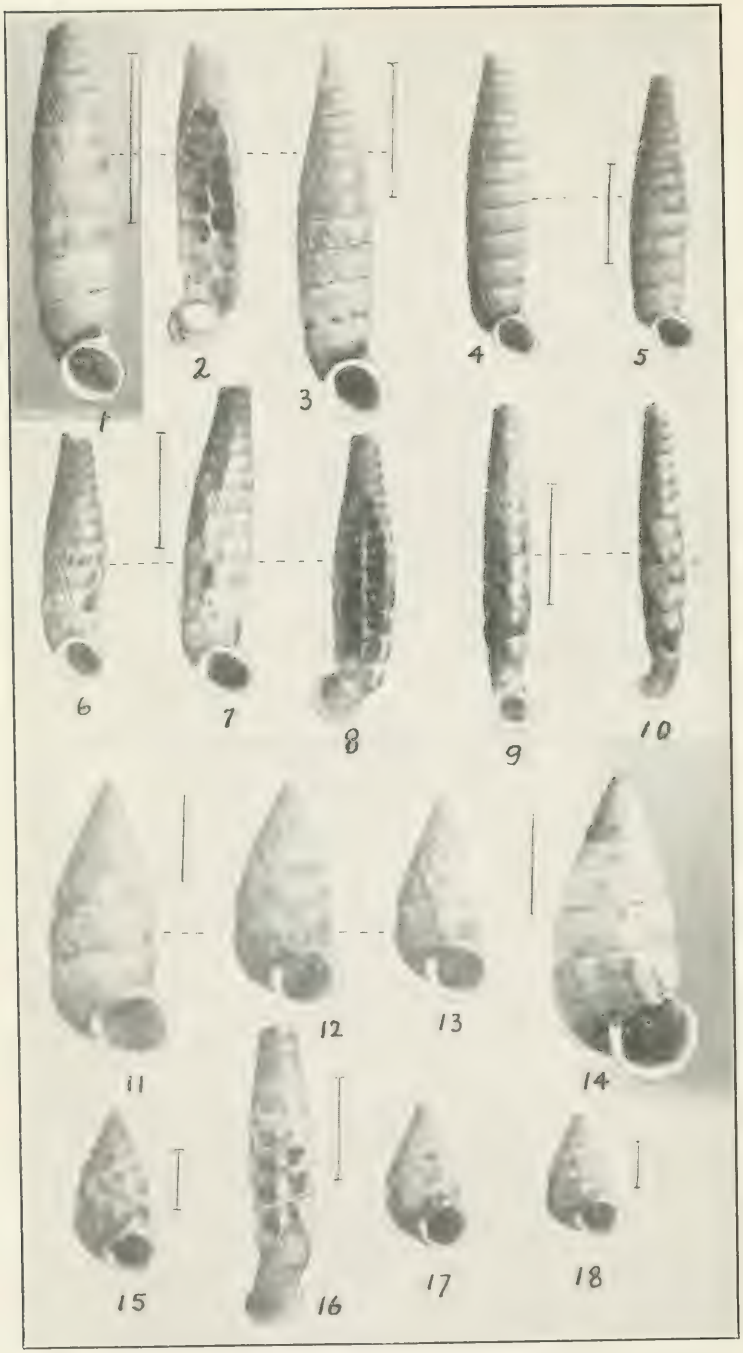
(*To be concluded.*)

NOTES.

Dr. Pilsbry will sail from San Francisco Jan. 7th, for the Hawaiian Islands, where he will spend several months in studying *Achatinellidæ* for the Manual of Conchology. Articles and notes for publication in THE NAUTILUS should be sent, up to April 1st, to Mr. Johnson.

FEEDING HABITS OF ARIOLIMAX.—Dr. C. Hart Merriam who has been summering in the redwood forest of Marin County California sends some interesting notes about the feeding habits of *Ariolimax columbianus*. He observed it taking the fallen drupes of the California laurel (*Umbellularia*) which have a tough skin covering a layer of pulp outside of a hard kernel. The snail took the fruit by the end which had been attached to the stem and was able, by protruding the buccal mass, to eat out the pulp between skin and kernel for about half the surface of the fruit without breaking the rind. Subsequently it was observed to gnaw off the base of a toadstool about 3 inches in height with a stem a quarter of an inch in diameter, and make a meal of the stem. It is probable notwithstanding its "carnivorous" dentition that these slugs live chiefly on such vegetable matter. W. H. DALL.

MUSSELS IN A WATER MAIN.—The London Metropolitan Water Board officials have just made an extraordinary discovery. Recently it was found that a 36-in. water main at Hampton-on-Thames was showing signs of becoming choked. It was opened, and 90 tons of fresh-water mussels were taken out of a quarter of a mile of the main. The mussels were so tightly massed that the bore was reduced from 36 in. to 9 in.—*Popular Mechanics*, Nov. 1912.



NEW CUBAN UROCOPTIDÆ.

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TWO NEW CUBAN UROCOPTIDÆ.

BY H. A. PILSBRY AND J. B. HENDERSON, JR.

UROCOPTIS (GONGYLOSTOMA) LONGA, n. sp. Pl. VIII, figs. 9, 10.

The shell is cylindric or pillar-shaped, a trifle widest in the middle, tapering slightly to the rather wide truncation; whitish or pale brown, indistinctly mottled or rather distinctly streaked with brown; glossy, smooth, the last whorl thread-striate, contracted and angular above the origin of the neck, which is free and descends shortly. The aperture is somewhat oblique, subcircular. The peristome is rather broadly expanded, reflexed, white, usually brown-tinted below. Axis slender, encircled with a small, sub-basal lamella which is minutely spinose in the upper whorls.

Length 14.2, diam. 2.1, aperture 2 mm.; $13\frac{1}{2}$ whorls.

Length 15.5, diam. 2.1, mm.; $13\frac{1}{2}$ whorls.

A small rocky hill at Zaza del Medio, at the junction of the Sancti Spiritus branch with the Cuban Central R. R., Province of Santa Clara, collected by H. A. Pilsbry, April 15, 1904.

This species belongs to the group of *U. wrighti* as defined in the Manual of Conchology, vol. XV, p. 263. It differs from the species there described by its smooth surface. It is also different from the several new forms recently found by Professor de la Torre, all of which have been compared.

Urocoptis (Gongylostoma) cara n. sp. Plate VI, figs. 27–30.

The shell is very slender, pillar-shaped, of nearly equal diameter throughout, or tapering slightly towards the truncate summit; whitish, copiously mottled and streaked with brown; glossy, smooth (or rarely showing very weak traces of widely spaced striæ), the last whorl regularly thread-striate. The whorls are slightly convex, the last compressed towards its base, which is angular above the origin of the neck, last half whorl free, tubular and descending, rounded or having a weak keel below. The aperture is subcircular, white within, rather oblique; peristome broadly expanding, reflexed, white. The axis is encircled by two small, nearly equal lamellæ, the upper one more oblique, the lower thinner and shortly spinose. In the penultimate whorl the axis becomes noticeably gyrate and the upper lamella disappears.

Length 16.5, diam. 2.1, aperture 2.1 mm.; 14½ whorls.

Length 22.3, diam. 2.3, aperture 2.3 mm.; 20 whorls.

Length 13, diam. 2 mm.; 12½ whorls.

"San José rocks" about 2 miles northeast of Sancti Spiritus, Province of Santa Clara, Cuba, H. A. Pilsbry, April, 1904.

Several hundred specimens were taken from the vertical rocks where they clung in abundance, though in the main lodged in crevices and holes, like most of the slender Gongylostomæ, they vary widely in size and number of whorls. No complete individuals were found; and it appears that about 12 or 15 whorls are lost in large adults.

U. cara differs from species of the *U. wrighti* group by having two equal axial lamellæ. It is probably related to the unfigured *U. imparata* (Arango) which is described as fusiform-cylindric, whitish, with entire spire and 17 whorls.

Urocoptis hidalgoi cabrasensis, n. var. Pl. VIII, fig. 16.

Differs from *U. hidalgoi* by the sparse, weakly developed sutural nodules, shorter, less closely costate neck, and by having an intermediate collumellar lamella between the two large ones in the autepenultimate whorl. The shell is corneous with white streaks and maculæ, smooth except on the last whorl. Length 13½, diam. in the middle 3 mm.; 9½ whorls remaining. Cerra de Cabras, Pinar del Rio, collected by J. B. Henderson, Jr., 1909.

A COLLECTOR IN WESTERN CUBA AND THE ISLE OF PINES.

BY REV. H. E. WHEELER.

(*Concluded from page* 108).

The last few days of my vacation were spent on an excursion to the Isle of Pines, and I was fortunate in having Dr. de la Torre for a travelling companion. Looking at the map one sees that in outline it is very like the profile of an ancient volante, the typical Cuban carriage, and this comparison has been handed down by those who travelled in that curious and now almost forgotten vehicle.

Baron von Humboldt and Aimé Bonpland visited the Island early in the nineteenth century, making important geological and botanical observations. The first conchologist to explore its shores was D. Jose M. Velasquez. This was sometime in the early thirties, but he published no description of the species collected. A little later Count Arthur Morelet made an expedition to the Antilles, sailed around the Isle of Pines, landing near the present capital, Nueva Gerona, on the Casas River. His book, entitled "*Testacea Novissima Insulæ Cubanæ et Americæ Centralis*," describes species collected here as well as in Cuba and Central America. The species described from the Isle of Pines were:

Oleacina folliculoris (= *O. subulata*, Pfr?).

Oleacina paragramma (= O. solidula, Pfr.).

Cylindrella (Urocoptis) pruinosa.

Cyclostoma semicanum, a very rare species from the South Coast.[2]

Cyclostoma pupoides.

Cyclostoma disjunctum (a synonym of C. moreletiana, Petit, disjunctum being preoccupied).

Helicina (Priotrochatella) constellata,[3] and Helicina scopulorum.

Poey described *Trochatella stellata*[4] from Velasquez' manuscript. This species is not found on the Sierra de Casas, the home of its nearest congener, *Trochatella constellata*, but on the Sierra de

[1] Published 1849-1851.

[2] At Carapachi Bei, meaning "Turtles' Bay," a name given to it by the fishermen of Cayman's Islands.

[3] See Revue Zool., 1847, p. 147.

[4] See Poey, Mem. I., pp. 117, 447; and Jay, Cat. 1850.

Caballos, a mountain some three miles to the East of Las Casas and across the Casas River.

Gundlach visited the Island about the year 1854 and collected all the species previously described and some others which were described by Poey and Pfeiffer. These were:

Chrondropoma dissolutum, Pfr., a species so near Chondropoma pictum that it may be worthy of a varietal position only.

Trochatella luteo-apicata, Poey. Trochatella callosa, Poey.

Helix (Jeanneretia) pityonesica, Pfr., which so far as studied does not appear to be distinguishable save, in size from the common multistriata.[1]

Helix (Cysticopsis) comes, Poey (near cubensis, Pfr.).

Glandinella (Bulimus) poeyanus, Pfr., together with a new genus, Pineria, which is represented by four species only two of which were described from the Isle of Pines. These were: Pineria beathiana, Poey, and Pineria terebra, Poey. The latter is not only one of the rarest, but also one of the most curious, of land shells.

The only addition to the fauna of the Isle of Pines since Gundlach is *Cerion pinerium*, Dall, and a variety of this species is claimed by its discoverer to be the smallest of the genus.

It was Dr. de la Torre's hope to find some new thing in the Sierra de la Canada in the interior of the Island. But this range proved to be a quartz formation covered with pine trees,[2] which surely have the right of way, so far as native vegetation is concerned, on the Island. The common grass of this region is *Hypericum galioides*, Lam. At the foot of the mountain, however, we collected

Oleacina oleacea, Fer. Subulina octona, Brg.

Helix (Jeanneretia) pityonesica, Pfr. Thysanophora vortex, Pfr.

On the Sierra de Casas we collected all the known species from that locality, *Urocoptis pruinosa*, Mor., rather plentifully. There seemed to be two forms of this species, one which was stout and large, the other much more slender, but fully as long. Near Nueva

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[1] The generic position of *multistriata* is still problematical, and can only be definitely established by an examination of the soft parts.

[2] *Pinus caribæa* Morelet. This tree grows also in Western Cuba, Florida and the Bahamas, and until recently (1904) has been confused with *Pinus cubensis* Griseb., the pine of Eastern Cuba.

Gerona we collected two fresh-water species, *Ampullaria conica*, Wood, and *Physa cubensis*, Pfr.

Everywhere we saw great colonies of ants[1] which are there so destructive to vegetation. One of the most dread pests, however, is the *Jejene*[2] (pronounced hay-hay-nie), a tiny fly, smaller than a gnat, whose sting, while not very painful, raises innumerable little bumps on the skin which smart unpleasantly. They travel in swarms and are not barred by ordinary mosquito netting, and, their favorite time for attack being in the night, one can only escape their ravages under a canopy of closely woven goods. When the Cuban wishes to take off a conceited man, he says: "He knows also where the jejene lays his eggs," something, by the way, which even the Naturalist has not yet discovered.

Of the parrots the *Ara tricolor* is about extinct, but the "*Catarra*" (*Chrysotis leucocephala*), the white-headed parrot, is still abundant, as well as the "*Perico*" (*Conurus evops*), a small paroquet with a long tail. Some six thousand of these birds are exported annually for pets, but to be trained to talk must be taken from the nest. The rare "*Cayama*," known to us as the Wood Ibis (*Tantalus loculator*, Linn.), seems here to adorn itself with all the glory it can borrow in a tropical environment.

The giant among the trees of this Island is the *Yagruma*,[3] whose dead leaves infold themselves making a good retreat for snails and wasps alike. One of the abundant wild fruits is the *Icaco*[4] used in preparing a sweet jelly, but this is found also in the coasts of Cuba. At the foot of the Sierra de Casas we saw that peculiar *Anacardium*[4] which produces a huge seed, shaped like a pear, externally to the fruit. The bottle palm,[5] called in Spanish *Barrigona*, having a bulge in its trunk like an Indian club, could not fail to attract attention, and another common palm was the *Miraguana*,[6] with slender trunk, whose leaves filled out a circle as perfectly as a daisy.

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[1] Spanish "Bibijagua," *Atta cephalotes*.

[2] *Œcacta furens*, Poey, not to be mistaken for the larger and less vivacious sand-fly.

[3] *Cecropia peltata*. See Prof. Simpson's reference to this and other Cuban trees in the "Collectors' Journal," Vol. I, Nos. 3, 4 and 5. His paper is entitled: "Notes from a Collecting Trip in Cuba."

[4] *Anacardium occidentale*, L. [5] *Colpothrinax wrightii* Griseb. and Wendland.

[6] *Colpothrinax miraguano*.

What of commercial opportunities in the Isle of Pines? Opinions will vary. But some indication may be had in the fact that out of a total population of eight thousand, five thousand are Americans. The land itself is by no means fertile. There is nothing specially inviting in the scenery, excepting the North Coast, and educational advantages are quite meager. Schools and churches there are, and many cultured people, but morals are at a low ebb generally. The climate is the Island's greatest asset, and its chief products will always be the citrus fruits.

NEW JAPANESE OVULIDÆ.

BY H. A. PILSBRY.

OVULA (NEOSIMNIA) HIRASEI, n. sp. Plate 7, fig. 4.

The shell is fusiform, its greatest diameter contained 2.8 times in the length; thin, bluish white, the ends pale ochre colored for a distance of 4 or 5 mm.; glossy, under the lens showing distinct very fine longitudinal striation, and about 6 oblique, low and well separated spiral cords at the lower end, one or two more than this at the summit. The rest of the surface has a microscopic spiral striation, so minute as to be hardly noticeable except under the compound microscope. The two ends are about equally produced, pointed. Outer lip thickened outside and within, retracted at both ends, very indistinctly angular near the lower end, columella straight and simple. Near the summit there is a low, indistinct spiral swelling very obliquely encircling the axis. Length 28, diam. 10 mm.

Province of Tosa, Japan, Y. Hirase.

This species is longer and less swollen than *O. sowerbyana* Weinkauff (= *Ovulum spelta* Sowb., Thes. p. 480, pl. 100, f. 63, 64, not of Linné). It is decidedly more inflated than *O. carpenteri* Dkr. The axial fold above is quite weak in *O. hirasei*, and the coloration is characteristic.

OVULA NIPPONENSIS, n. sp. Plate 7, fig. 9.

The shell is oval, angular at the ends, glossy, bright flesh-pink gradually becoming paler towards the lip; very indistinctly 4-banded with brown, maculate with brown on the back and behind

the ends of the outer lip, which is fleshy yellowish on the face. Sculpture of irregular growth-lines and weak, microscopic spiral striation, scarcely visible except under the compound microscope. At each end there are about seven spiral grooves, which are widely separated except close to the ends. The outer lip is very convex on the face, somewhat thickened outside, incurved and armed with about 28 unequal, not very strong teeth. The grooves between the teeth extend as far as the middle of the face of the lip. The columella bears a strong white fold, terminating outwardly in a vertical callus on the ventral side of the base of the shell. There is scarcely any anterior notch. Posteriorly the callus of the peristome extends downward from the apex and towards the aperture. Deep within the aperture there is a longitudinal callous ridge on the parietal wall of the aperture. Length 13.5, diam. 9 mm.

Fakara, Awaji, Japan, Y. Hirase.

This belongs to a rather numerous group of species, among which it is nearest to *O. bulla* Adams and Reeve (Zool. Samarang p. 21, pl. 6, fig. 5). The new form is less narrow anteriorly and differently colored. It is blunter at the ends than *O. punctata*.

A NEW LYMNAEA FROM MONTANA.

BY FRANK C. BAKER.

GALBA MONTANENSIS, n. sp.

Shell of medium size, rather thin, translucent, ovate-turreted; periostracum light horn color; surface shining, lines of growth distinct, crossed by very fine wavy spiral lines; whorls six, convex, the body whorl somewhat obese; sutures deeply impressed; spire acute, longer than the aperture; aperture ovate, outer lip thin; inner lip wide, somewhat triangular, reflexed over the umbilical region; there is no distinct axial plait, but the inner lip is slightly indented where it touches the parietal wall; the umbilical chink is narrowly open. There are two rest period marks on one adult specimen.

Length 14.00; width 6.50; aperture length, 6.80; width 4.00 mill. adult.

Length 9.00; width 5.00; aperture length, 5.50; width 3.00 mill. juv.

Length 14.25; width 8.00; aperture length, 7.00; width 4.00 mill. adult.

Length 10.00; width 5.25; aperture length, 5.00; width 3.00 mill. juv.

Type locality. Hayes Creek, near Ward, Montana, in the Bitter Root Mountains, altitude 3825 feet.

Types in collection of L. E. Daniels.

This Lymnæid belongs to the *palustris* group and is related to *Galba vahlii* ("Beck" Möller). It differs from that species in being more solid, the periostracum more polished, and the aperture rounder. The greatest difference is in the inner lip, which is roundly and evenly reflexed over the umbilicus, lacking the twist so noticeable in this group, and resembling in this respect such species as *Galba bulimoides cockerelli* and *Galba caperata*. Half-grown specimens might easily be mistaken for *Galba bulimoides*, the spiral lines and narrow umbilical chink, however, easily separating them. *Vahlii* has not been found south of the 55th parallel, and there is, therefore, a wide gap in the range of the two species.

The specimens at hand show some variation, one specimen being very obese; while another, which is believed to be typical, has a rather long, turreted spire. The young, half-grown specimens are always obese. The specimens were collected by Mr. L. E. Daniels in April 1912.

RADIX AURICULARIA AT CAMBRIDGE, MASSACHUSETTS.

BY W. F. CLAPP.

About four years ago, a dam was built across the Charles River at Boston. Above this dam, nearly four miles of the river, which was formerly salt and full of marine life, is now fresh water. In the NAUTILUS, Vol. 25, p. 132, Mr. C. W. Johnson writes of a colony of *Modiolus demissus* v. *plicatulus* Lam., which until a few years ago, lived about two miles above the dam. I collected a very fine set of *Paludestrina salsa* Pils., and a few *Odostomia bisuturalis* and *trifida*, in 1893, nearly three miles above where the dam now stands. But records of the marine molluscan fauna of this part of the river seem to be very scarce.

In August, 1912, Dr. Walter Faxon brought me three specimens of *Radix auricularia* (Linn.), which he had found very near the place where I had collected *P. salsa*, and *O. bisuturalis* and *trifida* in 1893. In October, 1912, Dr. Faxon and I collecting again at this spot, secured several more specimens, varying in age from very young to fully mature. All we found were on *Chara*, and in more or less deep and exposed parts of the river. I examined quantities of *Potamogeton* without securing a specimen, but nearly every clump of *Chara* yielded at least one. In the shallow sheltered coves and ditches we found great quantities of *Galba palustris*, *Planorbis trivolvis*, *Planorbis albus*, *Physa heterostropha* and *Ancylus parallelus* but these species all avoided the deep water of the river as surely as *R. auricularia* kept away from the shallow places. I have never found *Galba palustris*, *P. trivolvis*, or *R. auricularia* in that part of the river above Watertown which has always been fresh water. The common species there are *Pseudo succinea columella* and *Planorbis bicarinatus*, neither of which have yet been found in the river at Cambridge.

There are numerous explanations for the sudden appearance of exotic species in unexpected localities. A very popular, and probably in many cases a true one, is that they have escaped from some nearby greenhouse. In support of this theory, I will admit that there are several greenhouses in Cambridge, and that from some of them to the river would be but a short walk, but a comparatively long crawl.

SPHÆRIIDÆ OLD AND NEW, III.

BY V. STERKI.

P. COLUMBIANUM,[1] n. sp.—Mussel of medium size, strongly inflated, outlines (along the valve edges) oval to elliptic without any angles, beaks somewhat behind the middle, large, prominent, rounded or slightly flattened on top, or even calyculate; surface more or less uneven from lines of growth, somewhat shining, with fine irregular striæ, color light corneous to yellowish, often in alternating zones, shell thin, sub-translucent; hinge rather slight, cardinal teeth small, the right curved with the posterior end thicker, left

[1] The name is not strictly in conformity with the rules, but appears preferable to *columbiense*.

anterior with apex pointed, posterior quite short; ligament and resilium rather short and slight.

Long. 4.2, alt. 3.6, diam. 3 mm. (100 : 86 : 71).

Long. 3.3, alt. 2.6, diam. 2.3 mm. (100 : 79 : 70).

Hab.: British Columbia, apparently widely distributed and common, and rather variable with respect to size and shape (no doubt, also in Washington, etc.). Vicinity of Esquimalt, collected by Mr. Taylor over twenty years ago, sent by Justice F. R. Latchford, No. 6362 cotypes with the lot in Mr. Latchford's collection, and lots simply marked "B. C." at least some of them from that vicinity, are in various collections; Chilliwack Creek and Lake, B. C., collected by a member of the Canada Geol. Surv. staff, sent by Mr. Whiteaves; a marsh, Duncans, B. C., received from Mr. A. W. Hanham. The first specimens were received in 1895, and the species has been regarded as distinct ever since.

P. furcatum, n. sp.—Mussel oblique, medium inflated, superior margin little curved, posterior and inferior forming one continuous curve to the rounded-angular anterior end, or the posterior margin slightly subtruncate; supero-anterior slope at an angle with the upper margin, well marked, straight or little curved, at an angle of alt. 45° to the longitudinal axis; beaks slightly behind the middle, rather large, rounded or slightly flattened on top; scutum and scutellum slightly marked, small; surface polished, with slight, shallow striæ; color plumbeous around the beaks, straw along the margins, the two shades not sharply defined, shell subtranslucent in the plumbeous area, rather opaque in the light zones; hinge moderately strong, right cardinal tooth curved with the posterior part bifid, the outer, or posterior, shank separated by a groove even above, straight or curved with the convexity below, left anterior short with apex rounded, posterior oblique, slightly curved, the space between them wide posteriorly; outer laminæ of the right valve small; ligament and resilium short, moderately strong.

Long. 4, alt. 3.6, diam. 2.3 mm. (100 : 90 : 57).

Hab.: Green Lake, Seattle, Washington, collected by Mr. P. B. Randolph, with *P. idahoense* Roper and others; types acc. No. 3896 b, part, of the Carnegie Museum, Pittsburgh. Probably none of the specimens are full-grown. The mussel resembles some forms of *P. variabile* Pme., but is more oblique, the color is different, and the cardinal teeth are markedly different; named from the strongly bifid, or bifurcate, right cardinal.

The mussel also somewhat resembles *P. randolphi* Roper, from Seattle, Washington, but is much more oblique, the beaks are larger, and the surface striæ are slighter, more shallow, and more distant.

P. (*furcatum* var.?) *rhombicum*.—Mussel smaller, more oblique, rhombic in outlines; beaks small, color more yellow; the posterior part of the right cardinal tooth is thin and plain and correspondingly the space between the two left ones is quite narrow; ligament short and slight. Long. 3, alt. 2.6, diam. 1.8 mm. (the largest specimen). Also probably none of these are full-grown. Hab.: with the preceding, in the same lot. Apparently of the same group with *P. furcatum*, to judge from the shape; more material will prove whether the two are distinct or forms of one species.

F. W. BRYANT.

Mr. F. W. Bryant, of San Diego, Cal., while visiting Hawaii, died of heart failure on October 23, 1912. Born in Ohio about 70 years ago, he was an old friend of the late Prof. A. G. Wetherby, with whom he often collected. He described several species of Californian land shells in THE NAUTILUS (vol. XIII, pages 122 and 143, 1900 and Vol. XVI, page 70, 1902). *Pyramidula bryanti* Harper, was named in his honor.

NOTES.

LAMARCK'S COLLECTION OF SHELLS.—We take the liberty of quoting from a letter to one of the editors written by Mr. Charles Hedley from Geneva, Oct. 18, '12. "I have just been through Lamarck's types and have been rewarded for my trouble by recovering two or three lost species. The Lamarckian collection was as you know bequeathed by Delessert to the Geneva Museum. It is in excellent preservation, kept locked up apart from the general collection in four cabinets. The shells are gummed on the usual tablets and in the case of the bivalves the original label in Lamarck's writing is pasted to the under surface of the tablets. Each tablet has a colored margin to indicate geographical division; thus Australasia dark blue, Indian ocean yellow. "There is also a copy of the

Animaux sans vertebres annotated by Lamarck himself. I supposed that this neat mounting was done by Chenu, but the present custodians did not know. The director and his assistants pay great regard to this collection but they have not a conchologist on the staff. One part of a memoir illustrating by photography the shells of Lamarck has already appeared. I saw proof of the next part which should be issued this year, and will include the bivalves.

"This Museum has also the complete collections of Brot, the specialist on *Melania*, who was a Geneva citizen. Also the collection of Bourguignat, who left it here."

Banded Polygyra mobiliana: Some months ago I received from Herbert H. Smith a few *Polygyra mobiliana* Lea from near Mobile, Ala. Most of the shells were immature but I noticed that three adults were distinctly banded and some of the young also showed a faint band. On bringing the matter to Mr. Smith's attention he examined all that he had remaining and found that the majority of them were banded. Since then Mr. L. H. McNeill of Mobile has collected numerous specimens and finds most of them banded. I have just received 17 specimens from him of which 15 are banded. The band is brown, much darker than the balance of the shell, and is located just above the periphery. Shells collected at Foley, Baldwin Co., are bandless and Smith says that he has seen no banded shells of this species except those collected near Mobile. Mr. McNeill informs me that he got a great many of this species by "sweeping" the grass at night with an insect net.—Geo. H. Clapp.

Murex fulvescens Sowerby: Some handsome specimens of this species, pure white in color and measuring about seven inches in length, were recently obtained by Mr. J. H. Holmes in the Gulf of Mexico, off Wakulla Co., Fla., at a depth of 125 feet.—C. W. J.

Pseudogalba, new name for Simpsonia.—Mr. Bryant Walker has called my attention to the name *Simpsonia*, which is preoccupied by Rochebrune (1905), for the Naiad previously known as *Chamberlainia duclerci*. The name *Pseudogalba* may be used in place of *Simpsonia* (Lymnæidæ of North and Middle America, page 236). It is perhaps expressive of the relationship of the group to *Galba*.—Frank C. Baker.

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COLLECTING IN PANAMA.

BY EUGENE W. PRESBREY.

In 1850, C. B. Adams, Professor of Zoology in Amherst College, spent six weeks collecting in the waters of Panama Bay. In 1852, under his own direction, he published a complete catalogue of species collected, with careful notes on synonymy, stations and number of each species taken.

The writer recently spent two weeks covering carefully exactly the same territory, from Old Panama to Taboga Island, about fifteen miles. It may interest the readers of The Nautilus to know what changes in numbers, stations and characteristics may occur in sixty-three years. Many changes have occurred, due probably to disturbed environment. Adams, in six weeks, took 41,835 specimens, 516 species! ! Of these there were 38,920 Gasteropoda, 376 species! ! In the same season of the year, from the same rocks and sands, with the same tides—eighteen to twenty-four feet—the writer, in two weeks, under most favorable conditions, was able to find only 112 species of Gasteropoda, and about 1000 specimens. Some of these species were not found at all by Adams, who was a careful collector, letting nothing escape him, not even numbers. But the peculiar and interesting fact is that few of the species found in great numbers by Adams are plentiful now, and many of those species are not to be found at all. In many stations other species have taken the place of those found by him.

Adams collected 4500 *Oliva volutella*. These are not there now. Two dead on the beach, and one alive, were all that I found. Of

Oliva porphyria, Adams found only a broken fragment. I hunted in vain for even that. I doubt if Panama is now its natural habitat, as the shell was scarce in 1850 and is not found there now. Adams took 1500 *Nassa panamensis* on the reef that juts out from the old sea wall. Not a single Nassa is to be found there now. Of *Nassa luteostoma*, Adams took 330 near the old sea wall. They are not to be found there now, they having migrated two miles across the bay where a bushel could be taken at one tide. Adams found fourteen species of Nassa, I found four. Adams found incredible numbers of Nerita, two species, took 3200 specimens. Of these only 400 were *Nerita scabricosta*, the only species to be found in considerable numbers now on the high-tide rocks. Adams found 29 species of Columbella, 3000 specimens ! ! Four good specimens of *C. harpaeformis*, brought up by hermit crabs, and half a dozen other species, beach worn, rewarded persistent search.

Monoceros cingulatum. Adams found only 75, most of them young. Of these one may get a thousand adults in one tide—but not at Panama, at Taboga Island. Adams took 3900 specimens of Litorina, 12 species. Now, only one species to be found in considerable numbers. Adams found 110 specimens of *Ricinula reeviana*, I found one.

Conus, then and now: *brunneus*, 4—0; *gladiator*, 70—1; *mahogani*, 17—0; *nux*, 2—12; *princeps*, 8—4; *purpurascens*, 12—1; *regularis*, 1—0; *mus*, 0—25. I was fortunate enough to find two specimens of *Conus panniculus* Lam. at Taboga, one alive, and both splendid specimens. Has this or any other of the Texti been recorded from the Panama Province? A fine specimen of *Conus fergusoni* Sby. was found, a species not recorded in the Conch. Iconica, and considered doubtful by Tryon. This specimen, after removal of the olive-green, persistent epidermis, shows perpendicular stripes of delicate yellow alternating with lavender, from rounded shoulder to base where the colors merge into pale ashy brown, columella and interior violaceous white. All other specimens that I have seen are dead white. The figure in Tryon's manual is not *C. fergusoni* either in form or color. *Fergusoni* has the rounded shoulder and heavy form of *Conus betulinus* or *C. glaucus*, depressed accuminated spire, whorls eight, rounded and canaliculate.

Purpura seems to be more plentiful than when Adams was there. He found 8 species, 600 specimens. Two miles from Panama one

might take a thousand each of four species in a single tide. These seem to flourish under conditions that have driven other species away. I am unable to recognize many of Adams' species.

Many Marginellas dead in the sandy mud, few alive. Adams saw only fragments of *Strombus galea*, easily found now, both young and old. All the Strombi attributed to this province are found in good condition but, like other species, washed ashore. They are more plentiful than when Adams was there, but found at Taboga only. *Ranella caelata*, Adams took 190 specimens, alive, at half tide. None alive from high to low tide now. Crabs bring them up in great numbers and good condition.

Adams found Murex, 9 species. Found them alive, from half tide to low. Not now. Hermit crabs and diving black boys are the collectors now. Many beautiful and absolutely perfect specimens, too, are washed up dead, to half tide. I found six varieties.

Adams names only one species of Fusus (bellus). I took four species at Taboga, two species alive at half tide. Hermits could have furnished a peck. *Cancellaria* about the same but not alive. *Pleurotoma* abundant, but in no such numbers as indicated by Adams. Few alive. *Cerithium*. Adams found 14 species, 3400 specimens! ! Half a dozen species now brought up by hermit crabs.

Turritella banksi. Adams took 350 specimens, one-third of them alive. They have gone to deeper water but crabs bring up fine specimens. Adams found 90 specimens of *Pedipes angulata* under Panama sea wall, and 650 *Auricula panamensis* in same station. Not a specimen of anything to be found there now except Purpura in small numbers and Nerita out of water. Adams indicated scarcity of *Pecten* and *Pectunculus*. Now most plentiful decoration of the beaches. Adams found *Cypraea cervinetta*, *arabicula*, *punctulatis* and *pustulata* on the Panama reefs. Not one of these there now. There is no coral. To be found in small numbers at Taboga where there are small patches of coral to furnish food.

Recapitulating: for four miles either side of the Canal mouth in the Bay all but the coarser, sturdier forms have disappeared. Chitons, Purpura, Siphonaria and Fissurella are there, but few others, and all in small numbers. There is no food on the reefs. Everywhere, in the region covered by Adams, the stations and habits have materially changed. It might be interesting to compare individual specimens of to-day with those of same species taken by Adams

sixty-three years ago. Forces capable of changing habitat and habit might change form and characteristics.

My method in collecting is to traverse the beaches and from dead or broken fragments of shells, observation of tide currents, eddies, and prevailing winds, mark out probable stations at low water or beyond. The method is seldom wrong and leads to live specimens, either for wading or dredging, in shortest time.

Some species in Panama Bay have gone to other stations. Some have disappeared. Nearly all have sought deeper water and stay there.

Very solid volcanic rock, some of it nearly pure iron, is continuous from two miles west of Panama City to Taboga Island, fourteen miles. The Canal runs through part of it, and over the rest of this strata. Heavy dynamite blasts on the main land and on the islands in the Bay where Canal fortifications are to make another Gibraltar, can be felt distinctly at Taboga, too far away to be heard, sometimes. These concussions are frequent, occurring many times a day. A breakwater extends from the mouth of the Canal to the island fortifications. This breakwater is two miles long, and all day long train-loads of dynamited rock are dumped into the waters of the Bay on either side. It is possible that four years of concussion and waters more or less poisoned by nitroglycerene, plus the sewerage of Panama, may have destroyed food and driven the species to new stations, to deeper water, or worse, destroyed many of them. The volcanic reef ends abruptly a mile out and the water suddenly deepens to thousands of feet. At Taboga the conditions are more favorable and there is superb collecting ground, but even there low tide does not expose the live species—to any encouraging extent. The inference that all Panama species near the Canal have sought deeper water is justified.

There is a big suction dredge at Balboa near the mouth of the Canal. This dredge takes up everything from bed rock to top sand and sends a twelve-inch stream of water, mud, and millions of shells (seldom alive), a mile or two inland to make new land. Most of these shells have not been dead long, some are semi-fossil. There is fine collecting at the end of that pipe. But specimens taken there indicate wholesale destruction of molluscan life at the mouth of the Canal.

The most interesting "station" however on the Isthmus is in

Culebra Cut, 150 to 260 feet above mean tide level. There, in squeezed-up marine strata, easily recognizable marine species may be found in considerable numbers. Some are, perhaps, as old as the Tertiary period, but many of them can be duplicated, alive, on the Pacific beaches. Coral is found 262 feet above present mean tide. Fifteen miles away in the Chagres basin marine deposits are also found. Sometime, not so very long ago, there was an open strait where the Isthmus now is. Is the Isthmus younger, very much younger, than scientifically supposed? How much younger? Is there any evidence—not of its age—but of its youth, to be found in the five tons of shell-bearing material sent to Washington by the diggers in Culebra Cut? I don't know. I'm only a gatherer of shells—with án imagination and some disposition to ask questions.

ON SOME CUBAN UROCOPTIDÆ.

BY H. A. PILSBRY.

The following notes relate to new or rare species collected by the writer in 1904. My journey was a rather rapid one, undertaken with the object of seeing something of the mollusk fauna of the central part of the island, as nearly all the Cuban shells I had studied had been taken in the relatively far richer and more frequently explored regions from Havana Province west, and in Santiago Province, or Oriente as it is now called.

My route was from Havana to Cienfuegos by rail, thence to Casilda, the Port of Trinidad, by the Menendez steamship line, thence to Tunas de Zaza on the south coast; by rail then to Sancti Spiritus, eastward to Majagua in Camaguey Province, and return by way of Matanzas. Collecting was done at the places mentioned as well as at many places along the route, and others within a day's journey on foot or mule from those named.

Around Havana, Matanzas, etc., various well-known *Urocoptidæ* were taken which call for no special notice, and also several forms of the *U. elegans* group—a very difficult series, not yet worked up, and extremely abundant in the environs of Matanzas and in Havana Province. *Urocoptis cara* P. & H., *U. longa* P. & H., and the following species may be mentioned among the new forms taken.

Urocoptis (Cochlodinella) mediana, n. sp. Pl. VIII, figs. 1, 2, 3.

The shell is cylindric-fusiform, the upper half or third tapering slowly to the truncate summit; thin; whitish-corneous with some indistinct clear corneous maculation. Sculpture of thread-like rib-striae, equal to or narrower than their intervals, nearly straight, slightly oblique, and somewhat irregular, *as though a thread were here and there omitted.* Close behind the lip the striation is crowded. Suture distinctly denticulated by the rib-striæ. The whorls are slightly convex, the last very shortly free in front, with a cord-like basal keel. The aperture is oblique, circular; peristome expanded and shortly reflected. The axis is slender and simple, as in *U. poeyana.*

Length 18, diam. 4, diam. aperture 3 mm.; 11½ whorls.

Length 16.5, diam. 3.4, diam. aperture 3 mm.; 11 whorls.

Length 13.5, diam. 3, diam. aperture 2.4 mm.; 10 whorls.

Zaza del Medio, Province of Santa Clara, on a small rocky hill close to the Cuban Central R. R., under stones.

This species is closely related to *U. poeyana*, from which it differs by the coarser striation, which is moreover irregular in places, while in *U. poeyana* the sculpture is close and even.

Urocoptis (Gongylostoma) canteroiana (Arango). Pl. VIII, figs. 4, 5.

Cylindrella canteroiana Gundlach MS., Arago, Anales Real Acad. Ciencias Habana, XII, p. 284, 1876.

A translation of the very brief and unsatisfactory description of this species may be found in my Manual of Conchology, XV, p. 254. In 1904 I collected it on the fine hill "La Vigia," which forms the background of the town of Trinidad, and where Gundlach had collected the types a half-century before. I found it on the slope looking out over the Caribbean Sea, on the west slope, and in a cave near the foot. Also in the foothills of the Trinidad Mountains on the west side of the valley of Trinidad, and along the trail in these mountains about two miles from San Joan de Letran.

The shell is cylindrical, the upper half or third tapering to a rather narrow truncation; uniform light brown, with lighter riblets; somewhat glossy. Sculpture of even, rather strong rib-striæ, nearly straight except on the last whorl or two where they are slightly

curved, as wide as their intervals. Sutures rather deep, whorls slightly convex, the last rounded below, very shortly free in front. The aperture is somewhat oblique, shortly oval, a little longer than wide. Peristome continuous and free, very little expanded, somewhat thickened, narrowly reflected. Axis bears one thin, minutely crenulated spiral lamella.

Length 14, diam. 3 mm.; 13 whorls.

Length 12, diam. 2.6 mm.; 13½ whorls.

UROCOPTIS (GONGYLOSTOMA) CIENFUEGOSENSIS, n. sp. Pl. VIII, figs. 6, 7, 8.

The shell is cylindrical, the upper half or third tapering to a rather small truncation; white, mottled and streaked with corneous-gray, as in *U. variegata;* glossy. Sculpture of rather low, coarse rib-striæ, closer and sharper on the tapering whorls and on the neck behind the lip. Whorls slightly convex, the last rounded below, very shortly free in front. The aperture is slightly oblique and a little longer than wide. Peristome white, expanded and reflected, continuous and free. Axis encircled by a small, thin, minutely serrate lamella.

Length 15, diam. 3.1 mm.; 13 whorls.

Length 12.5, diam. 3 mm.; 12 whorls.

"Lagunilla," a place about 6 miles due north from Cienfuegos, where there are several small brackish lagoons.

This species has much external resemblance to *U. poeyana lacteoflua* Pils. It is most closely related to *U. canteroiana* Arango, from which it differs by the variegated coloration, weaker ribs and smaller axial lamella. It is the only species of *Urocoptis* I found in the environs of Cienfuegos. The small lagoons at Lagunilla are slightly salt to the taste. The rocks and sticks are thickly coated with *Congeria*, and there is also *Neritina virginea.*

MICROCERAMUS SANCTISPIRITENSIS, n. sp. Pl. VIII, figs. 11, 12, 13.

The shell is shortly rimate, oblong-territe, tapering from the last or the penult whorl in a long cone which is slender and straight-sided above. Ground-color brownish-corneous, becoming gray-corneous on the last whorl, the apex whorl or whorls brown or gray subsequent whorls with sculpture of rib-striæ which are white except

where interrupted by narrow patches or streaks of darker ground-color. On the base there are often several spiral corneous bands, leaving one to three spiral zones of long white granules. The rib-striæ are nearly as wide as their intervals, weaker in the corneous patches, and *continue upon the base.* Whorls rather convex, the upper ones more convex; last whorl rounded, with a very weak spiral cord defining the base, sometimes almost obsolete. The aperture is oblique; peristome well expanded, white, the columellar margin built forward, in a plane with the outer lip.

Length 12.7, diam. 5.5 mm.; whorls 10.

Length 11.3, diam. 5 mm.; whorls 9½.

Length 9, diam. 4.3 mm.; whorls 9.

Near Sancti Spiritus, Province of Santa Clara, at a place called "San José rocks," about two miles northeast of the city.

This is a larger shell than *M. petitianus* (Orb.), also known as *M. tunicula* (Pfr.), with stronger, closer striæ continuing over the base; it is not so wide and the spire is less attenuated above. The smallest shell found in a large series is 9 mm. long. Nearly all are over 10 mm.

San José rocks, conspicuous from Sancti Spiritus as a white ridge, stand upon a low ridge of gneiss which runs north of Sancti Spiritus. The rocks cover only a small area, but form a labyrinth of fissures, caves, tunnels, deep holes and knife-like crests, the whole clothed with trees and vines. Deeper and deeper I went, getting big Megalomastomas and Helicea in the cool rock chambers. The charming new *Urocoptis cora* hung on the cliffs. Operculates quite new to me were turning up. Finally I was quite lost in this absurdly diminutive jungle. I had dropped down several cliffs of eight or ten feet in gaining the heart of the thicket, and there was nothing to do but go on in as straight a course as I could steer. After a hard scramble of half an hour I emerged on the lower side, wet with perspiration and scratched by the sharp rocks, but happy in the possession of a fine bag of snails.

The rocks of San José are apparently a remnant of the Oligocene deposits which must once have heavily blanketed the gneiss in this region. Little trace of these beds remains in the country around Sancti Spiritus.

I found a variety of this species at Zaza del Medio, where on a small rocky hill or on the adjacent slope to the river I picked up two

lots, of 13 and 5 specimens respectively.[1] In one lot the shells are more conic than the types, with the rib-striæ more delicate and sharp, obsolete on the base. Specimens measure:

Length 10.5, diam. 5 mm.; $9\frac{1}{2}$ whorls.

Length 10, diam. 5 mm.; 9 whorls.

Length 9, diam. 4.2 mm.; 9 whorls.

In the other lot the shells are larger but also sculptured with delicate, thin rib-striæ, much narrower than their intervals. Length 13, diam. 6 mm., 10 whorls. This race may be called var. *tenuistriata* (pl. VIII, fig. 14).

MICROCERAMUS PERCONICUS TRINIDADENSIS, n. var. Pl. VIII, figs. 15, 17, 18.

The shell is imperforate, the last two whorls forming a broad, shortly cylindric part, those above rapidly tapering in form of a straight-pointed cone, slender above; rather glossy; corneous-brown, the last 4 or 5 whorls nearly covered with patches on which the striæ are opaque white. Whorls convex, the earlier ones more strongly so. Sculpture of regular, closely set, retractive striæ, as wide as their intervals, every second or third one a little enlarged at the upper end, forming *an irregular series of subsutural papillæ*. The last whorl is rounded, or there may be an inconspicuous very low cord upon which the striæ enlarge, defining the base. The aperture is oblique; peristome scarcely expanding, slightly thickened and white within, the interior elsewhere light brown. Columella vertical, straight, projecting forward a trifle near the insertion, the margin dilated above and adnate, not built forward.

Length 7.3, diam. above aperture 3.2, including aperture 3.75 mm.; whorls $8\frac{3}{4}$.

Length 7.7, diam. including aperture 3.9 mm.; 9 whorls.

Length 5.8, diam. including aperture 3.2 mm.; 8 whorls.

West side of "La Vigia," Trinidad, under stones, etc. Also on the northwest side.

M. perconicus trinidadensis stands near *M. angulosus* ("Gundl.," Pfr.) which it resembles in sculpture and in the structure of the columella, but it differs by the much more obese shape constant in a large number collected, and by the stronger sutural denticulation.

[1] Most of the small shells I got at Zaza del Medio were lost through an accident. These two lots were saved by being in bottles carried in my pockets.

The shape, indeed, is almost exactly that of the west Cuban *M. denticulatus*—a species less closely striated and having a rimate base and built-forward columellar margin. *M. petitianus* has narrower, more separated striæ and no denticulation below the suture; moreover, it has a shortly rimate base and forwardly-built columellar margin.

M. perconicus (which I described as a variety of *petitianus*) is doubtless a species distinct from *petitianus*, differing in sculpture and the columella, which is not in the least built forward. It is more strictly conic than *trinidadensis*, without sutural denticles, otherwise the same. *M. palenguensis*, which I have not seen, seems to be broader with a larger aperture.

The specimens recorded as *M. turricula* Pfr. from Trinidad were probably *trinidadensis*. I have not seen the form reported from Cabo Cruz.

Macroceramus canimarensis (Pfr.).

A single specimen, typical in form and sculpture but white with a corneous base, I found among rocks in a precipitous, shaded place on the northwest side of La Vigia. It has already been reported from Trinidad.

Macroceramus canimarensis rotundibasis, n. subsp.

The shell differs from *canimarensis* by having only a very weak trace of the subperipheral keel (which is strongly developed in *canimarensis*); the base being much more convex than in *canimarensis*, and not so strongly striated.

"San José rocks" near Sancti Spiritus.

I did not find this species living, but dug it from a bed of clay formed by disintegration of the limestone.

A LIST OF MOLLUSCA FROM THE MUSSELSHELL VALLEY, MONTANA.

BY S. STILLMAN BERRY.

Except for the brief lists by Squyer (Nautilus, Vol. VIII, pp. 63–65, 1894) and Elrod (Bull. Univ. Montana, No. 10, pp. 170–174, 1902), there are very few molluscan records extant for the entire

state of Montana, so that the following list of species from the upper Musselshell Valley, in the central part of the state, is of interest from a distributional standpoint. The exact locality is Winnecock, Meagher County, where the writer has done a little collecting during August of two succeeding years (1911–1912). The fresh-water species were taken in the various springs and overflow pools bordering the Musselshell River, and the terrestrial species occurred under sticks, leaves and stones in the more moist places among the surrounding cottonwoods. No species were taken in the swift-flowing waters of the river itself, and no land forms were found at a greater distance from the river than a few rods. All except *Vertigo binneyana*, *Zonitoides minuscula* and *Planorbis callioglyptus* were of fairly frequent occurrence. The elevation of Winnecock is about 4000 feel about sea level.

Vallonia costata montana Sterki. The specimens appear to correspond very well with Dr. Sterki's diagnosis, and specimens sent to Mr. George H. Clapp were similarly determined by him. They are possibly the same as the "*Vallonia gracilicosta* var., close to *costata* Say," of Squyer's list.

Vitrea radiatula Alder (*hammonis* Ström.).

Zonitoides arborea (Say).

Zonitoides minuscula (Binney).

Euconulus fulvus (Müller).

Agriolimax campestris (Binney) var. The specimens are perhaps to be referred to the *montanus* of Ingersoll.

Pyramidula cronkhitei (Newcomb) near var. *anthonyi* Pilsbry.

Succinea avara Say.

Succinea retusa Lea.

Lymnæa palustris Müller.

Lymnæa caperata Say.

Planorbis parvus Say.

Planorbis callioglyptus Vanatta. A single poor specimen is thus somewhat doubtfully determined.

Planorbis antrosus Conrad (= *bicarinatus* Say).

Physa gyrina Say var.

Aplexa hypnorum Linné.

CHARLES W. GRIPP.

Mr. Charles William Gripp, of San Diego, Cal., who is known to many of our readers as an indefatigable collector and generous correspondent in exchanges of shells, died as the result of a serious accident in San Diego, January 3, 1913, aged forty-eight years. Mr. Gripp was a native of Odeshög, Sweden, and came to America in 1875. Since 1897 he was connected with the San Diego post-office. The funeral services were held on January 6th, and interment was made in the Masonic cemetery. Mr. Gripp was especially interested in the Californian, and particularly the San Diego mollusk fauna. He made various excursions beyond the entrance of the harbor in fishing boats, and by careful attention to bottom samples and stones brought up on the roots of kelp, discovered in this way a number of new species and increased our knowledge of the old ones. His collection was very complete in his specialty, and arranged and labeled with that neatness and care more common with European than American collectors. Personally he was agreeable, generous and considerate, and will be much regretted by his correspondents. He left a widow, who was, at the time of his death, seriously ill in a hospital, thereby adding to the pathos of the circumstances under which he died. W. H. D.

NOTES.

Cannibal Snail.—A carnivorous mollusk called *Glandina* was imported into France from Mexico some months ago, and at a meeting of the Academy of Sciences in Paris, Professor Bouvier asserted that its cannibal propensities were conferring immense benefit on market gardeners.

Snails commit serious depredations on French cabbages and salads, but since the arrival of the *Glandina*, which lives on snails and slugs, the latter have largely decreased, and agriculturalists are able to send their produce to the Halles in perfect condition.

When the Mexican mollusk encounters a French snail, it thrusts forward its head, and, penetrating to the innermost recesses of the enemy's shell, devours its prey alive. The eggs of the *Glandina* are as large as those of some birds.

The experiments conducted with a hundred giant snails from Mexico have proved so satisfactory that arrangements are being made to supply 2000 more to the market gardeners round Paris.—*Daily Mail.*

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NOTES ON A FEW BRITISH COLUMBIA MARINE SHELLS.

BY A. W. HANHAM, DUNCAN, B. C.

The following notes do not refer necessarily to rare, or even uncommon species and are in some cases only a comparison of common species occurring at different localities, sometimes not very widely separated.

Victoria is on the south end of Vancouver Island, inside the Straits of Juan de Fuca; Maple Bay and Departure Bay lie on the East or inside coast of Vancouver Island, the former South of Departure Bay and distant about 30 miles; both are sheltered or more or less land-locked; Salt Spring Island lies along outside the entrance to Maple Bay, and in the channel outside this entrance the water is very deep.

Terebratella transversa Sowerby. This species is common on the underside of rocks at Maple Bay, and may be found not far below high water mark where the shore shelves steeply and the rocks are well piled up.

Pecten hastatus Sowerby and *Pecten rubidus* Hinds. These species occur together, and in the channels off Nanaimo and Departure Bay I have seen them brought up in the dredge by the pailful. Both are sometimes coated, even on both valves, with a native sponge, bright yellow in color when living, named *Myxilla parasitica*, Lambe.

Hinnites giganteus Gray. Very fine specimens may be taken among the rocks at Maple Bay at low tides, but the big fellows are hard to detach without breaking or chipping the lower valve. A nicely grown specimen makes a good ash-tray.

Axinaea septentrionalis Midd. Reported by the late Rev. G. W. Taylor as being not uncommon on the Northern and Western Coasts of Vancouver Island, but not observed by him at Victoria or Departure Bay, so that I was all the more surprised this summer, to pick up a specimen in good condition at Maple Bay lying on the beach near high water mark. Through the kindness of Mr. Taylor I possess a good set of the species from Northern waters.

Psammobia rubroradiata Nuttall. The late Rev. G. W. Taylor in his List of the Marine Mollusca of the Pacific Coast of Canada, refers to this as being a rare species, stating that he had not seen living specimens. At Maple Bay this appears to be one of the species occurring there in numbers, broken shells are in abundance, and quite good ones are often washed up, many still retaining the animal, and of quite a fair size. This shell seen lying in the water is rather a beauty, but in the cabinet a very ordinary shell, as the color seems largely to disappear.

Semele rubropicta Dall. Quite a rare species at Maple Bay, and while it might be captured by dredging, half a dozen specimens or odd valves represent the catch for almost as many seasons.

Volutella pyriformis Carpenter. This is a little beauty, and while Taylor refers to it as a common species, I have only been fortunate enough,—with the exception of a tiny juv. specimen at Maple Bay, —to find it once, and that was at Foul Bay, near Victoria; here under a stone in a cavity under a large boulder, I secured a small colony.

Purpura lima Martyn. (= *canaliculata* Duclos). This is the only Purpura that I have taken in any of our inside coast waters since leaving Victoria; there, *P. crispata*, Chemnitz, and *saxicola*, Val., occurred in perhaps equal numbers with Lima: this absence seems rather strange. The *P. lima* of Maple Bay is very common, a large shell, solidly built, heavy, and sometimes brightly colored and banded.

Cerostoma foliatum Martyn. I took only two specimens of Cerostoma all the time I lived in Victoria, and those at extreme low tide; at Maple Bay this is a fairly common species among the rocks between tides, and juv. specimens are quite abundant.

Eulima micans Carpenter. This species is usually only to be obtained in our Northern waters by dredging in from ten to forty fathoms, but I have met with it rarely at Maple Bay at extreme

low tide buried in a sponge on the underside of large flat rocks on which this sponge sometimes grows in masses.

Bittum filosum Gould. The species is abundant at Maple Bay on rocks at low tides among the sea weeds, and many of the living shells are white in colour.

Isapis obtusa Cpr. Since my notes on this species in the February Number of Vol. xxlv, a further search the following August in the same locality, showed the shell to be quite plentiful on its same host, *Tapes staminea* Conrad.

Natica clausa B. & S. and *Lunatia pallida* B. & S. A few small specimens, living and dead, fell to my bag on one of my few dredgings in Departure Bay.

Velutina laevigata Linn. At Maple Bay very occasional at extreme low tides among the rocks, but not, I believe, a rare species when dredging in from 10 to 30 fathoms.

Acmaea patina Esch. This and allied species are of course plentiful both at Victoria and on all our rocky coasts, but none of the shells found in our inside waters are of any size, miserable specimens when compared with those taken at Victoria, from which locality I have some beauties.

Acmaea mitra Esch. The same remarks apply to this species, except that at Maple Bay it is in addition quite a rare shell, and those taken have been very small and depauperate-looking, while in Departure Bay I have not yet met with it.

Fissuridea aspera Esch. This is one of our common species at Maple Bay between tides, and generous in size, like those I have from near Victoria, and certainly much more abundant than there.

Leptothyra bacula Carpenter. A rare species, I believe, in northern waters, and the only specimen that I have taken—except on Southern California beaches—was a small one out of a root of kelp washed up after a storm. This root was still attached to some very large barnacles, and was rather a "gold mine" for small species, as *Alvanias*, etc.

Margarita lirulata Carpenter. At Maple Bay by far our most abundant "top;" swarms in certain seaweeds on the rocks at extreme low tides, and stray specimens may even be taken on the under side of stones between tides, associated with small *Littorina*. As Taylor has pointed out, this is a very variable species in our waters.

Margarita helicina Fab. Reported not uncommon between tides around Victoria; not yet discovered at Maple Bay.

Solariella peramabilis Carpenter and *Solariella cidaris* Carpenter. I have a few nice examples from dredgings in or near Departure Bay, the latter though, only from channels outside the bay.

Note. While I have been able to do much more collecting at Maple Bay than at Departure Bay, dredging has as yet been attempted only at the latter locality.

"Errata." NAUTILUS, Vol. xxiv, page 114, line 10, read "tiny" instead of "fine."

SPHÆRIIDÆ, OLD AND NEW, IV.

BY V. STERKI.

Pisidium overi, n. sp.—Mussel rather small, oblique, with the anterior part somewhat longer, medium to well inflated; superior margin short, nearly straight, posterior subtruncate to rounded, inferior well curved; supero-anterior slope beginning with an angle, close to beaks, rather long, straight to slightly curved; anterior end situated well below the median line, rounded angular; beaks rather small, rounded; surface dullish to somewhat glossy, with very fine subregular striæ; shell thin, translucent, nearly colorless to pale corneous; hinge medium stout, plate narrow; cardinal teeth rather long, moderately curved to nearly straight, the right not, or little thicker in its posterior part, left anterior with its apex rounded to somewhat pointed in old specimens; ligament and resilium rather short and slight.

Long. 3.5, alt. 3, diam. 2.4 mm. (100 : 91 : 68).

Long. 3.3, alt. 2.7, diam. 2.1 mm. (100 : 82 : 64).

Hab.: Clear Lake, Deuel Co., S. Dakota, collected by Mr. W. H. Over, in several lots, in 1906 and 1908; types No. 5752 and corresponding with those in Mr. Over's collection, in whose honor the species was named (in 1906). Apparently the same *Pisidium* is from Cannon Lake, Rice Co., Minnesota, collected by Mr. L. E. Daniels in 1905 (No. 5595); the two specimens in the collection are somewhat larger and more inflated, with the beaks higher.

P. overi somewhat resembles *walkeri* St. in shape and appearance,

but is smaller, the anterior part of the mussel is much smaller, and the cardinal teeth are markedly different, as seen in quite a number of specimens.

Pisidium nevadense, n. sp.—Mussel inequipartite, oblique, higher in front of the beaks than behind, medium inflated; superior and posterior margins little curved with a rounded—somewhat over right—angle between them, inferior rather long, somewhat descending toward the rounded anterior end, supero-anterior slope somewhat curved; beaks nearer the posterior end, medium large, rounded, slightly prominent over the hinge margin; scutum and scutellum barely marked; surface somewhat shining, with slight irregular striæ and a few slight, impressed lines of growth; color: straw, shell subtranslucent, rather strong; hinge curved, medium stout, plate rather broad; cardinal teeth rather large, the right with the anterior part somewhat thickened, the posterior much thicker, with a deep groove, nearly bifid, left anterior long, angular-curved, posterior long curved, oblique, extending forward well beyond the apex of the anterior; laminæ little projecting inward, cusps short, pointed, especially those of the left valve; ligament and resilium rather long, moderately strong. Long. 6, alt. 4.8, diam. 3.3 mm. (100 : 80 : 55).

Hab.: Nevada Co., California; types no. 56278 in the National Museum, and my collection no. 2726; of the former, one specimen is 6.4 mm. long. For my specimens I am indebted to the late R. E. C. Stearns, being identical with those of the National Museum, which were received from (and collected by?) J. J. Rivers. Evidently distinct from all described species, but the specimens were shelved in the hope of getting additional material. This *Pisidium* has the best-formed cardinal teeth of any seen.

P. (*nevadense* var., or sp.?) *modicum*, n.—Mussel of similar appearance, but smaller, less oblique, not higher in front of the beaks than behind, beaks somewhat broader, color more whitish; long. 4.3, alt. 3.5, diam. 2.6 mm.

Hab.: White Pine, Nevada. Specimens are in the collection of Mr. B. Walker, from the Wetherby collection, and my collection no. 5813, part of the original lot; more are probably in other collections.

P. glabellum, n. sp.—Mussel small, somewhat oblique, rather well inflated; superior margin nearly straight, bounded by angles in front and behind, supero-anterior slope nearly straight, anterior end

rounded, posterior and inferior margins forming one curve; beaks slightly posterior, rounded or somewhat flattened on top, moderately prominent; surface polished, with very fine, slight striæ, color corneous, occasionally with a slight reddish tinge, to clear amber, shell transparent to translucent; hinge stout, plate rather broad; right cardinal curved, its posterior part thicker, left anterior with apex pointed, posterior rather short, oblique, well curved; ligament and resilium short, strong.

Long. 2.2, alt. 1.9, diam. 1.4 mm. (100 : 87 : 64).

Hab.: New England to Pennsylvania and Minnesota. Types No. 324 from Hess Lake, Newaygo Co., Mich., collected by Mr. L. H. Streng, received in 1895, then regarded as distinct and named. No. 78977 of the Philadelphia Acad. Nat. Sciences, from Point Pleasant, N. J. (F. H. Brown, Aug., 1890), conform with the types. From various places there are specimens of nearly the same size and appearance, but more or less different in shape: superior margin more curved, beaks narrower and more elevated, the anterior end more angular, e. g. from Graham's Creek, Nepean, Ont., collected by Justice F. R. Latchford in 1911, No. 6812. They appear to represent a variety.

P. glabellum has some resemblance to small forms of *P. splendidulum* St.; the latter is widely distributed, common and very variable, but from all its forms, *glabellum* proved distinct. The hinge is markedly strong and somewhat like that of *P. variabile* and *compressum;* the mussel is somewhat like a miniature *P. variabile*, and it appears to range with that group.

P. lermondi, n. sp.—Mussel rather small, subequipártite; outlines nearly elliptical along the valve edges, well inflated around the beaks, impressed along the margins, with cutting edges; beaks a little posterior, rather small, somewhat prominent over the margin; surface polished, with shallow, irregular striæ; color deep corneous to somewhat olivaceous, shell transparent to translucent, thin; hinge slight, plate quite narrow; cardinal teeth little curved, the right with its posterior end slightly thicker, left posterior short, quite above the anterior; laminæ rather short and slight, cusps in the left valve pointed; ligament and resilium slight.

Long. 3.4, alt. 3, diam. 2.5 mm. (100 : 88 : 73).

Hab.: Duck Pond, Warren, Me., collected by Mr. N. W. Lermond (in whose honor the species was named), Sept., 1909. Types No.

6364, and in the collection of Mr. Lermond. Also at other places in the vicinity of Warren, Me.

The shape of the mussel is quite peculiar, especially in front or rear aspect, and if there were only one or a few specimens, they might be regarded as abnormal. Some forms of *P. medianum* St. are of somewhat similar shape, in lateral view, but they are of light color, the shell is not transparent, the surface dullish, and the hinge is quite different. Young and half-grown specimens may be mistaken for *P. splendidulum*.

Sphærium acuminatum (Pme.). *Cyclas acuminata* Prime, Proc. Boston Soc. Nat. Hist., iv, p. 155, 1851, was made a synonym of *S. striatinum* (Lam.) in Mon. Corb., p. 37, by Prime, but it is distinct, as evidenced by the specimens (a few valves) in the Prime collection.[1]

Cyclas albula Pme., l. c., is probably the same, to judge from the specimens—two poor, washed left valves in the Boston Society Natural History (No. 8086)—but not from the description. There are no specimens of *C. albula* in the Prime collection (Mus. Comp. Zool.), and for the above reasons it appears proper to use the name *acuminata*, though *albula* has precedence, yet both are on the same page.

The species is common in the great-lake region, and rather variable.

S. ohioense n. sp.—Mussel somewhat inequipartite and elongate, moderately inflated, the valves rather flat toward the margins, superior and inferior margins slightly curved, anterior margin rounded or obliquely subtruncate above, posterior obliquely truncate to subtruncate, end rounded; beaks small, slightly elevated; scutum and scutellum rather long, narrow; surface dull, with rather fine striæ—or sulci; color straw to yellowish corneous to grayish in old specimens; shell rather thin, hinge slight, plate narrow; cardinal teeth small, short, posterior part of the right thick, nearly cubical, laminæ slight; ligament and resilium rather long, slight.

Long. 11.5, alt. 8.2, diam. 5.3 (100 : 73 : 45).

Soft parts not examined.

Hab.; Ohio River and tributary. At Cincinnati on Nov. 1, 1895, I collected a good number of specimens, young to adult, in com-

[1] "Origin," probably from Lake Superior, also two valves in the Boston Society of Natural History (No. 8085).

pany with *S. striatinum* and *stamineum*. Types, No. 1172. Ohio River at Cannelton, Ind., collected by Mr. L. E. Daniels, Sept. 23, 1904; Elk River at Shelton, Clay co., W. Va., collected by Dr. A. E. Ortmann, July 10, 1911. *A. Sphaerium* almost exactly like these, and apparently identical, was collected at Joliet, Ill., by Mr. Jas. H. Ferriss, in 1896, (No. 1354).

Musculium orbiculare n. sp.—Mussel rather small, inequipartite, nearly circular in outlines with the postero-inferior part slightly extended, moderately and evenly inflated; beaks quite small, narrow, little prominent, calyculate, somewhat inclined forward; surface somewhat shining, smooth, with slight, microscopic striæ; color pale corneous to grayish with narrow straw colored zones along the margins: shell thin, hinge slight, cardinals small, the right angular with the posterior part about as thick as long; the whole tooth is little projecting, inclosing a triangular excavation for the left anterior; laminæ rather long, slender; ligament and resilium rather long, slight;

Long. 83, alt. 7.5, diam. 3.8 (100 : 90 : 48).

Hab.: Ill., Ind.; Athens, Ill., Nason collection in the Illinois State Lab. Nat. History seen in 1911. Types No. 6796. Hammond, Ind., collected by Mr. L. E. Daniels, Aug. 3, 1904 (No. 4400).

This species is markedly different from all others seen and appears to be distinct. It has some resemblance to *M. elevatum* Hald., but is much smaller and slighter, less inflated, the beaks are much smaller, and it differs from half grown *elevatum* of about the same size more than it does from adults.

There are still large numbers of *Sphæriidæ* on hand, of all three genera, which cannot be referred to any of the described species. Yet it is precarious to establish new species on them, considering the great variation of many species. On the other hand, haphazard lumping would do more harm then good, and is unscientific. More good material from all over the continent is desirable, and will help ascertaining their real relations. Also a large number of well marked varieties and subspecies, partly very interesting in several respects, systematically and geographically, are on file, and will be published later.

SOME CRITICISMS ON DR. F. HAAS' MONOGRAPH OF THE UNIONIDÆ.

BY L. S. FRIERSON.

The well known Monograph of Unionidæ of H. C. Kuster is now being continued by Dr. F. Haas, and 35 plates of fine figures have been received. Dr. Haas is a prolific maker of new genera, he having added already 14 new ones to the tremendous total, although three plates only deal with the groups of eastern Asia. The new genera are fully as heterogeneous as are many of those of his predecessors.

Shells so close as *Nodularia jourdyi* Morelet and *douglasiæ* Greg. are widely separated, and yet such diverse material as *jourdyi* and *asperula* Lea are placed together. The *Physunio crossei* and *Nodularia rusticus*, by Simpson's classification, are placed by Dr. Haas in the same genus, etc., etc.

The specific determinations are equally open to criticism. A few of the more striking are as follows: On plate 33, figs. 7, 8 and 9 are given as *P. micropterus* Morelet, and *Unio pulcher* Tapperone-Canefri is given as a synonym. While these species bear considerable resemblance in their external facies, yet they are so diverse as to warrant their being placed in different genera, as was properly done by Mr. C. T. Simpson. *P. micropterus* has very small but well-defined beak cavities, while *pulcher* has none. *L. pulcher* has a row of several dorsal muscle scars, while *micropterus* shows none (*i. e.*, hidden beneath the interdention). More especially, *micropterus* has a "third muscle scar" over the anterior adductor, not shown by *pulcher*, and the latter has the anterior adductor and protractor scars *widely separate* (which is shown in Haas' figure), while in *micropterus* they are confluent. Other differences might be noted, the whole forcing us to place *micropterus* in *Physunio*, while the *pulcher* belongs to *Lamellidens*, as Mr. C. T. Simpson properly placed them.

Figures 11 and 12, plate 31 are said to be figures of the *Harmandia somboriensis* Rochebrune. If these figures are from authentic specimens, then *Harmandia* must lose its place as a genus, for figures 11 and 12, are young *Hyria*, from South America. Even more singular is the treatment of the genus *Trapezoideus*, on plates 32 and 33. It is impossible that the sundry figures given as *Trapezoideus*

miscllus Morelet can represent a single species. If Fig. 4, plate 33, is not an abnormal or diseased shell it must be a *Solenaia*, probably the *Solenaia* (*Mycetopus*) *rugatus* Sowerby.

The figures 3, and 4, plate 32, are equally impossible. They are supposed to be *Trapezoideus foliaceus*, Gould, but are really an undescribed shell, not far removed from the *N. dimotus* Lea (figured in the work, on plate 19). I have had for several years, a set of these, purchased, with a label "*Trapezoideus foliaceus*, Gould, Ex. Berlin Museum, *Birma*," and possibly a part of the same lot figured by Dr. Haas. Not being able to match them with Gould's species, I submitted them to Dr. Dall, who placed them near to *dimotus*, I, therefore propose for the species as figured by Haas, (fig. 3, and 4, plate 32) the following name.

PARREYSIA DALLIANA n. sp.

Shell small, rather thick, somewhat ovate. Length (of a medium specimen) 4.5; height (near end of ligament) 2.7; Diameter 2, mm. Rounded before, basal and dorsal lines nearly straight, post basal point rounded. Epidermis olivaceus, greenish in young shells, brownish in old specimens, and frequently *bleached*. Beaks very small, pointed, low, and incurved, with fine zigzag radial sculpture, which extends a little down the shell, and especially down the post slope; in dirty, or eroded specimens hardly to be noticed. The shell is a little inflated, the post ridge rounded. Inside the nacre is soft cream or white. The left valve has two cardinals, the anterior blade-like, and the posterior much smaller, and tubercular. The laterals are double (or even inclined to be trifid); in the right valve the cardinals are split or double, and the laterals single.

The anterior cicatrices are confluent, and also those of the posterior.

Habitat is stated to be "Birma."

The shell is stouter, shorter and more inflated than *P. foliaceus*, and the posterior portion is not as green. The species lacks the sculpturing of *P. dimotus*, and the direction of the cardinal teeth is different. The shell is a *Parreysia* according to Simpson's ideas of classification.

SHELLS COLLECTED AT MANZANILLO, WEST MEXICO, OCT. 1910, BY C. R. ORCUTT, IDENTIFIED BY WILLIAM H. DALL.

Gadinia peruviana Sby.
Siphonaria lecanium Cpr.
Bulla punctulata Ads.
Terebra variegata Gray.
Conus princeps Brod.
Conus arcuatus Sby.
Conus nux Brod.
Conus gladiator Brod.
Mitra funiculata Rve.
Vasum cestum Brod.
Lyria barnesii Gray.
Latirus ceratus Wood.
Purpura triserialis Blv.
Cantharus sanguinolentus Ducl.
Nassa corpulenta C. B. Ads.
Columbella major Sby.
Columbella festiva Sby.
Anachis coronata Sby.
Anachis sulcosa Sby.
Nitidella cribaria Lam.
Muricidea dubia Sby.
Craspedotriton scalariformis Brod.
Morum tuberculosum Sby.
Cypraea arabicula Lam.
Trivia pacifica Gray.
Strombus gracilior.
Cerithium maculosum Kien.
Cerithium uncinatum Gmelin.
Cerithium gemmatum Hinds.
Planaxis nigritella Forbes.
Planaxis nigritella var.
Littorina conspersa Phil.
Hipponix grayanus Mke.
Crepidula onyx Sby.
Calyptraea mammillaris Brod.
Trochita spirata Forbes.
Crucibulum imbricatum Brod.
Natica chemnitzianum Pfr.
Polinices uber Val.
Scurria mesoleuca Mke.
Turbo squamigerus Rve.
Uvanilla unguis Mawe.
Tegula globula Cpr.
Nerita bernhardi Recl.
Fissurella alba Cpr.
Fissurella microtrema Sby.
Fissurella rugosa Sby.
Chiton albolineatus Sby.
Arca grandis B. & S.
Perna chemnitziana Orb.
Lima pacifica Orb.
Phacoides lampsus Dall.
Cardium consors Sby.
Cardium magnificum Desh.
Venericardia crassicostata Sby.
Venericardia cuvieri Brod.
Anomalocardia subimbricata Sby.
Chione undatella Sby.
Paradione squalida Sby.
Tellina cumingi Hanley.
Tellinides viridotincta Cpr.
Semele proxima C. B. Ads.
Tagelus politus Cpr.
Thracia plicata Desh.

The above list has a value for geographical distribution, which justifies its publication.—W. H. Dall.

BOSTON MALACOLOGICAL CLUB.

The November meeting was devoted to reports by members on the work done during the summer, collecting or otherwise. At the December meeting Mr. C. J Maynard gave an account of the distribution and variation of the species of *Cerion* in the vicinity of Nassau, New Providence, Bahama Islands, showing a large series of specimens and illustrating with the aid of a map how the various species and varieties were distributed from what he considered the original starting point. At the January meeting the Secretary gave an account of the various forms of the foot in mollusca, and its adaptation to the habits of the species. Mr. Olof O. Nylander, of Caribou, Maine, spoke at the meeting, February 10, on the distribution and variation of *Lymnæa emarginata* Say and the var. *mighelsi* W. G. Binney, in Aroostook Co., Me. A large map, on which was marked the various colonies, clearly showed its limited distribution throughout the Fish River lakes, and a beautiful series used in illustrating his paper published in 1901, with many additional specimens, showed all the gradations between *L. emarginata* and *mighelsi*. The speaker referred to the great abundance of the species in some years and their scarcity in others, and the probable causes; also of the changes which are now taking place in the region detrimental to their existence.

HENRY W. WINKLEY, *Secretary*.

NOTES.

A NEW FORM OF OREOHELIX.—*Oreohelix haydeni betheli*, n. subsp. Typically flat and broad, with a lower spire and wider umbilicus than true (Utah) *O. haydeni;* last embryonic whorl concave or even grooved next the suture. The spiral cords are strong throughout, often more numerous than in typical *haydeni*, 10 to 16; fine interstitial spirals visible. Alt. 10, diam. 21 mm. Abundant under rocks on north side of Grand River at Glenwood Springs, Colorado, collected by E. Bethel, J. Henderson, T. D. A. Cockerell and others. The true *betheli* occurs on the north side of the river, but on the opposite side is a related form (*alta* Pilsbry, n. v.) with the spire conoidal and the umbilicus narrower, and also other forms to be described later.—H. A. PILSBRY and T. D. A. COCKERELL.

Mr. C. J. Maynard is now in the Bahamas making further studies on the distribution of the various species of *Cerion*.

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